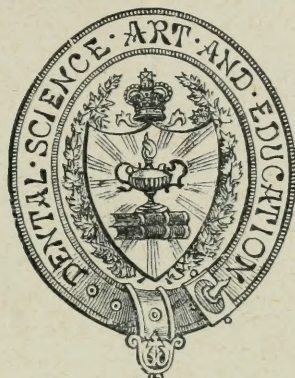




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No. 1

Original Communications

ALVEOLAR OSTEOCLASM AND GINGIVITIS.

A. J. McDONAGH, L.D.S., TORONTO, ONT.

To the College of Dental Surgeons of the Province of Quebec:

GENTLEMEN,—Allow me to express my appreciation of the honor you have conferred on me in inviting me to address you.

Part of the title which I have given my paper will probably be new to some of you, namely, Alveolar Osteoclasms. But I will not take the time to-night to explain the meaning of it, as it has been already explained in the DOMINION DENTAL JOURNAL of July, 1911.

I made the statement in speaking before the Alumni Association of the Dental Department of the University of Buffalo that for some time now the dental profession has been looking for a name which will properly designate the disease or diseases of the dental-alveolar joint, often called pyorrhea alveolaris, interstitial gingivitis, phagadenic pericementitis, and goodness knows how many other names, and so far there is no name on which all agree.

Why do we interchange all those names and think we are talking rationally? Simply because we do not understand what we are talking about. That there has been good reason for the manufacture of the different titles I will not dispute, but that they all or any one of them can be properly applied to the different phases of the disease or the different diseases which comes under the cognomen of Riggs Disease would be unreasonable to maintain.

Shakespeare says, "What is in a name? A rose by any other name would smell as sweet." But we should as professional men be able to use a name which will correspond to the scientific knowledge we have of the lesion. For instance, when we use the word phagadenic pericementitis we should mean that the pericementitis is phagadenic and that it is not pyorrhea alveolaris or interstitial gingivitis.

All over the civilized world to-day the spirit of investigation permeates every group of educationists and all progressive indi-

viduals. We see it in all branches of science, and the profession of dentistry is not lagging behind. This disease which we are speaking of this evening gets its full share of the limelight, and different men in far separate parts of the country are using every endeavor to enlighten us regarding the nature, the cause and the cure of the baneful malady. Every man who spends time and thought on the subject is worthy of consideration, his writings scrutinized and his facts noted.



Fig. 1.—X 6 diameter. Section of root : C—Cementum, H.C.—Hypertrophied Cementum, D—Dentine, P.D.—Peridental membrane forming cementum on broken surface of dentine, P—Pulp canal. (Fletcher)

One man in one part of the country may discover a truth and another man in another part of the country another and a different truth, and by piecing the work of the different investigators together we may be able to enunciate an intelligent doctrine.

Dr. Pierce, one of the greatest advocates of rheumatic diathesis as the cause of Riggs disease, has given us many reasons why his theory must be the right and the only one.

The advocates of this theory claim that the deposits on the root of an affected tooth contain urates, and that if in analysis of these deposits urates are not found it is on account of faulty technique. Dr. D. D. Smith, up to last year or so, at all events, claimed that in every case if the deposits were removed, the socket would be restored to health, therefore it was a local irritation due entirely

to local irritants, the constitution having nothing to do with the case.

Dr. Eugene Talbot has taught us that in every case where pyorrhea or Riggs disease exists the patient is suffering from indururia, which is in conjunction with faulty metabolism, faulty elimination and auto-intoxication. A peculiar condition exists in the alveolar tissue and the gum tissue, the blood vessels in the bony alveolus are constricted so that in auto-intoxication, when the heart is extraordinarily stimulated a congestion must take



Fig. 2 - Cross section of superior molar showing consolidation of two roots by hypertrophied cementum. C -Cementum, D -Dentin, P -Pulp canals. (Ground section X 15. (Fletcher)

place in the alveolar structure, which is, as he says, deciduous tissue, and through these causes interstitial gingivitis and dissolution of the bone results. The conclusion being that the disease is of a constitutional character.

Then there is the micro-organic theory, championed by many serious thinkers.

Dr. Timothy Leary, in the *Cosmos*, tells us that he has made a discovery along this line and brings to our notice the fact that there is a micro-organism, habitually in the mouth, benign as a rule, but

capable of becoming pathogenic under certain conditions. This micro-organism is the fusiform bacillus.

It appears, according to Dr. Leary, that those who have been investigating to find the micro-organism connected with pyorrhea have not used a media in the culture of the micro-organism which was agreeable to the fusiform bacillus. For instance, he says:

"Goadby, who has done so much along the line of treating pyorrhea by opsonic vaccines, and who has had a certain amount of success in that line, was mistaken in the organism which produced the trouble, because he used an agar media, which is not a good media for the production of the really offending germ." He men-



Fig. 3—Section of decalcified root, X 100. D—Normal dentin, C—Hypertrophied cementum from root, P.C.—Pericementum. (Fletcher)

tions Simms, Carmalt-Jones and Humphreys as being also mistaken through the media they used. By using milk media he obtained the growth desired.

This micro-organism is not one of the pus-forming variety. It will grow in the tissue with very little, if any, production of pus, so that when it penetrates below the gum margin it needs the assistance of some other form of organism to produce the pus, which is so often connected with alveolar osteoclasm.

But it is also a fact that, if no other organisms such as the short chained streptococcus, or the pneumococcus or staphylococcus, happen along to keep it company, or if the conditions are unfavorable to the growth of those organisms, this fusiform bacillus will grow on its own account and cause the destruction of the tissue.

That, gentlemen, is one of the most plausible theories from a micro-organic standpoint that could be put forward to account for this disease in its different forms.

Let us consider the different theories enunciated for a few moments and see if there is any truth in them. Personally, although they seem contradictory, I believe they are all true. Probably even scientific men become biased in trying to prove their own theory and cannot see the truth in another man's argument, or possibly an investigator's opportunities for examining varied cases may be limited.

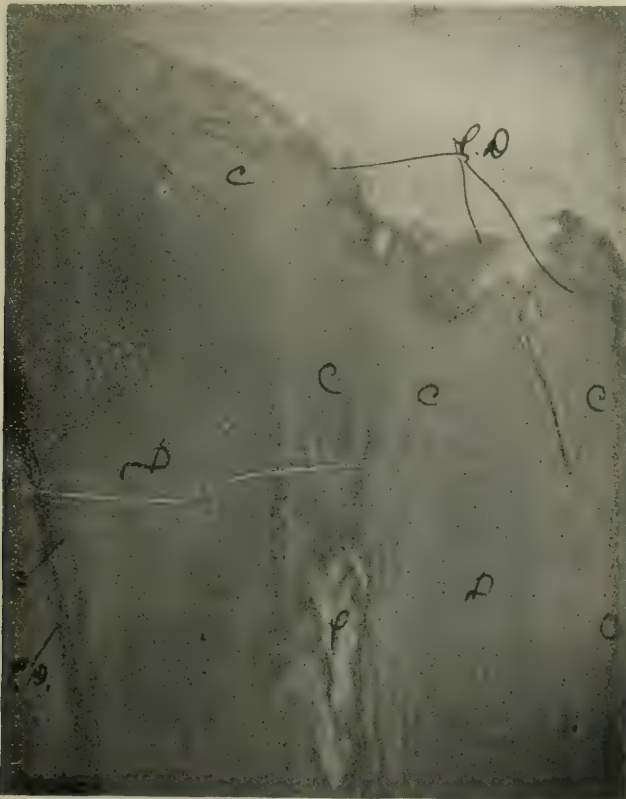


Fig. 4.—Section of the decalcified root, X 60. D.—Dentine, P—Pulp chamber, C—Cementum filling in the chamber and root canal, P.D. Peridental membrane adhering to the surface of the newly formed dentine where the latter has formed upon the broken surface of dentine.
(Fletcher)

Let us speak of the tissues anatomically which we are considering as diseased: we have the gum tissue, the alveolar tissue, the pericementum and the cementum of the teeth, all closely related one with the other. The gum tissue, the first mentioned, is attached to the periosteum and the pericementum, but not to the tooth in any way. It is abundantly supplied with blood vessels, freely anas-

tomosed and resting against the neck of the tooth, forming the gingivae, or the part through which the tooth has been born.

The periosteum and the pericementum become one at about the position the gum tissue joins them, and at the joint, which is also the joint at the neck of the tooth, the fibrous tissue of the pericementum is exposed to the fluids of the mouth, and these fluids laden with micro-organisms ordinarily, have only the free margin of the gum to pass to bring their micro-organic material in connection with this fibrous tissue, and where the gum does not cling tightly to the neck of the tooth, as we often find in cases of irregu-

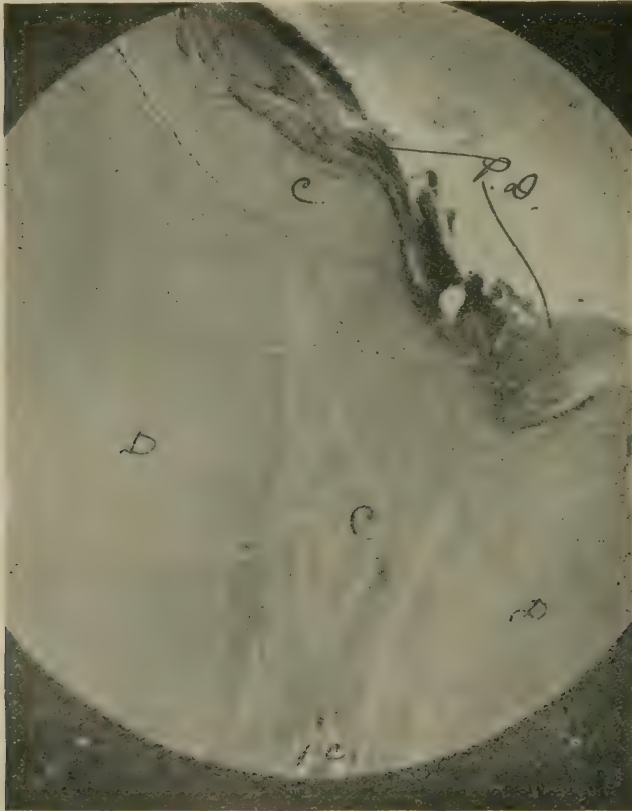


Fig. 5—Section of decalcified tooth, X 100. D.—Dentin. C.—Cementum filling in the pulp chamber and root canal. P.D.—Periosteal membrane adhering to the surface of the newly formed cementum where the latter has formed upon the broken surface of dentin. (Fletcher)

larity of the teeth, how easy it is for a large quantity of the fluid to find egress there. The pericementum has more than one function to perform: it acts as a cushion in its attachment and it helps to supply nutriment to the tissue of the tooth, but as long as the pulp of the tooth is alive this latter function is not called into requisition a very great deal.

When the pulp of a tooth is dead, perhaps and probably, that part of the work of the pericementum is increased; if so, the blood supply of the pericementum would be improved. Another of its functions is to prevent the tooth from being driven up into the bone, necessarily, therefore it is to a great extent fibrous tissues and its blood supply naturally is restricted.

Now, supposing that the blood flow has been interfered with by solid materials which should be eliminated through the digestive organs, and that it is thicker than it normally should be, there would be greater difficulty for the blood to flow through the exceedingly small blood vessels in the pericementum, and if there are toxic materials in the blood the heart's action is bound to be increased, and therefore congestion is a very great possibility at the junction of the periosteum, pericementum and gum tissue, and a still greater possibility in the very confined space which the pericementum occupies between the hard cementum of the tooth substance and the bony tissue of the alveolus. Congestion, of course, means deterioration and a very serious liability to attack by micro-organisms contained in the fluids under the free margin of the gum.



Fig. 6—Section of decalcified root, X 25. P.C.—Pericementum over newly formed cementum, N.C.—Newly formed cementum on broken surface of dentine and in pulp chamber, D—Dentine, C—Cementum. (Fletcher)

Or supposing from any cause the opsonic index of the blood is lowered, what chance has the leucocytes to fight those organisms.

Again, if the nerves of the individual become deranged and the blood pressure is lowered, the pericementum becomes anaemic and we have a condition similar to the above.

Once the micro-organisms obtain a foothold and establish a colony, they, by their own action and life produce toxins and ptomaines and become an irritation to the living tissues, producing atrophy and inflammation, and are capable of progressing automatically. The mucous cells are broken down, the blood serum oozes in, and with the assistance of the proper micro-organisms, pus is formed and calcic deposits are made on the root of the tooth.

If the micro-organism which has invaded that tract is not of the pus-producing kind, then the pericementum will become de-



Fig. 7—Section of decalcified tooth, X 310, showing union of new cementum with broken surface of dentin. P.D.—remnants of peridental membrane still attached to the newly formed cementum, D.—dentin, U.—union between cementum and dentin. (Fletcher)

stroyed and the condition which we call phagadenic pericementitis will be produced and the deposits will be practically eliminated.

That, gentlemen, is the theory which I have been advocating as the proper theory of those particular phases of the disease every time I have had an opportunity since I have been speaking on the subject.

But there are other phases of Riggs disease which this theory does not explain; for instance, you will find in the mouths of patients a very heavy deposit of lime salts just under the free margin of the gum, always, of course, in individuals who have not properly cared for their teeth, and these deposits of lime salts mixed with animal and vegetable matter are impregnated with

organisms and, besides being a mechanical irritation on account of their constituents, they become a chemical irritation through the by-products of the bacteria contained therein, and as they are allowed to increase and extend they destroy the periodontal membrane and the alveolar process and form quite deep pockets, and eventually destroy the entire organ of mastication.

This condition is explained by the "local irritants" theory and is entirely a filth disease.

Then there is another form of Riggs disease which is not explained by either of the foregoing theories, and that is the condition we find, and I must say when analyzed it is not a common condition, the condition in which the deposits are first formed on the root of the tooth higher up than the gingival margin, and which may not have any opening into the mouth at the free margin of the gum.

In these cases we sometimes have to lance right through the gum tissue and the alveolar tissue to reach the deposit. In this case, of course, the deposit must have been placed there by the blood stream and be a result of the condition known as a rheumatic diathesis.

Some investigators claim that these calcic materials may be deposited one connected with another until they open at the free margin of the gum. As I said a few moments ago, this condition is not common.

These three different theories, I think, embrace all the forms of Riggs disease we meet. Now as to how to treat those conditions most successfully.

When we understand the causes of the trouble and the pathological conditions that exist, it should not be very difficult to apply the remedy, barring mechanical hindrances. You can take a smooth plug of gold or porcelain, bore in the jaw, place it therein, or place it in the socket of an extracted tooth, fasten it to the adjoining teeth in a stable manner, and it will remain for years perfectly comfortable, causing no harm and inducing the tissues to maintain their positions and take on a healthy appearance. If so, and I can vouch for it being true, why not similar success with a smooth, denuded root? It is true, if you remove the deposits thoroughly and destroy the micro-organisms in the walls of the pockets, that you will have as much success in treating this disease as in treating any other dental lesion. The instruments you use, of course, will have a great deal to do in assisting you, but we must use the instruments, and remember that no instrument, no matter depend, not so much on the instruments as on our own ability to how good, will do the work for us.

I must not dwell too long on this part of the subject, but I must say a word about Pyorrhocide and Tartarsol: Pyorrhocide because it is so much advertised, and Tartarsol because I have had experience with it.

Tartarsol is the name given to Dr. Head's fluid, which he says

is bi-fluoride of ammonia, and which probably is mixed with hydro-fluoric acid. I have used it on 169 teeth, in the treatment of which I used about 600 applications, or an average of about four treatments to each tooth. In some cases the result was quite satisfactory, but in the majority of cases the results were very disappointing, and I found that I had to be very careful to avoid severely burning the tissues.

I have had very similar and nearly, if not quite, as successful results, without the danger of burning or absorption, by the use of warm lactic acid. In three cases, whether it was a co-incidence or a result of the Tartarsol, I am unable to say, the patient showed very serious constitutional disturbance. In two of these cases the lips became quite purple and the patient exhibited great difficulty in breathing. In the third case, besides these symptoms, the eyes became quite glassy and the patient lapsed into a *sémi-conscious* condition. However, they recovered in a short time and did not seem to have any permanent bad results.

I have never used Pyorrhocide in my practice, but I know a number of dentists in Toronto who have used it, and I meet a great many patients on whom it has been used. Of course it is a secret preparation, and as such perhaps should not be tolerated by the dentist, but it has done one good thing, and that is, by its being advocated and advertised a number of dentists have been induced to do something for patients suffering from pyorrhea.

Just here I want to state to you gentlemen that you do not need Pyorrhocide or Dentinol or any other patent nostrum to successfully treat pyorrhea. It is a disease to be sensibly handled in a surgical manner by educated, scientific, professional gentlemen, and if handled in that manner you will be surprised at the number of successes you will have. That being true, and I have had a certain

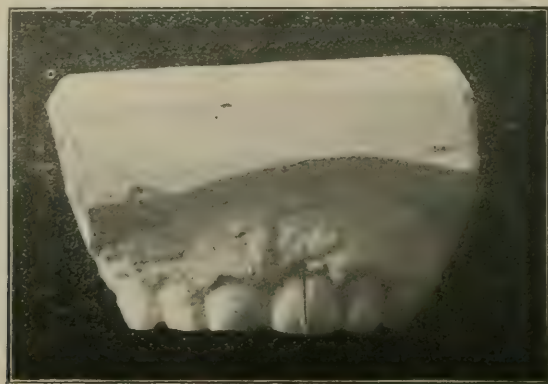


Fig 7

amount of experience, having treated pyorrhea for over twenty years to a greater or less extent, I can say from experience that the

more a man does along this line the more interested he becomes in the work and the more successful he is in his treatments.

A wise Providence seems to have constructed every man so that he is peculiarly adapted to do well some one thing, and I have no doubt there are many in your Association quite capable of treating this disease successfully. I tried to demonstrate my method in the clinic this afternoon, but every man will probably work out a method which is best suited to himself and use instruments through which he can obtain best results, so that by paying strict attention to cleanliness and thoroughness he will fulfil his mission in life and alleviate the sufferings of humanity.

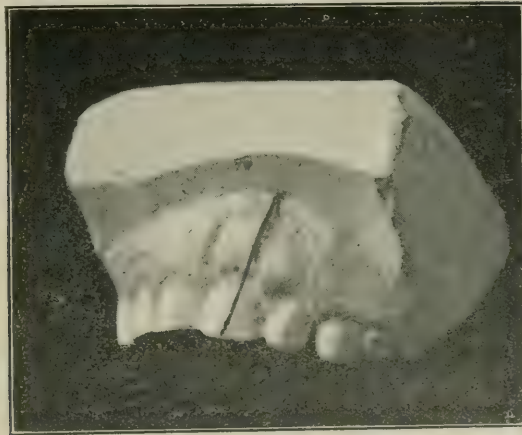


Fig. 8

I have a cast of the upper jaw in a man's mouth, and you can see for yourselves that the gum tissue appears comparatively healthy, and yet this wire which extends up into the pocket underneath the gum is fully $\frac{3}{4}$ inch long. Does it not seem that the possibilities of harm from this baneful disease are almost unlimited.



Fig. 9

In order to show what condition may obtain in an ordinary case

of Pyrrhœa. You will observe that in this cast there are two pieces of orange wood, which indicate the depth to which the disease has extended. On measuring them we find that the depth is $\frac{3}{8}$ of an inch.

I have some slides here which will probably interest the members of your Academy.



Fig. A.

A, the first slide which we throw on the screen, gives us the picture of a tooth which Dr. Daly, of Kingston, was good enough to give me. It shows to what extent salivary calculus sometimes grows. The tooth presented being an upper molar.

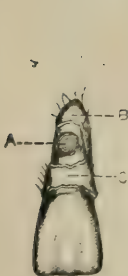
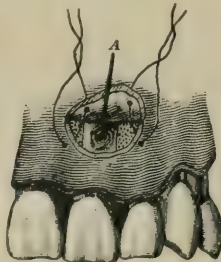


Fig. B.



A, calculus.

Fig. C.



Fig. D.

The next one, Figure B, will show you a typical case of a rare phase of this disease, where it is probably the result of rheumatic diathesis.

Figure C will show you the operation performed to overcome this disease.

The next, Figure D, is a cut showing a condition similar to that of the patient whose model, marked II., and which you have examined, the one I spoke of in my paper as having a pocket $\frac{3}{4}$ inch long, and the next slides I will show you I was fortunate enough

to obtain from Dr. M. H. Fletcher, of Cincinnati. I take this occasion to publicly acknowledge my gratitude to Dr. Fletcher for not only sending me the slides but also a section of the tooth.

These slides, as you will see, demonstrate that it is possible to have new cementum deposited by what is evidently newly formed pericemental tissue. The history of the case is given so splendidly by Dr. Fletcher that I will simply quote his words:

"A year or more ago a young woman came to me for treatment. About four years previously she had lost the crown of the first lower molar on the right by an attempt to have the tooth extracted. The crown had been broken at an angle quite below the neck, so that the soft tissues, when they began to repair, lapped partially over the broken surface. On close examination the soft tissues were found to be adherent to the broken surface of dentine. This being very unusual, the roots were carefully extracted, the lump of soft tissue still adhering to the broken surface. The anterior was decalcified, with some of the soft tissue still adherent. Sections were made from the root and adherent tissue. It was found that the cementum had not only grown over and become adherent to the broken surface of the dentine, but had partly filled the canal of one root from the top down, something after the manner of the growth of secondary dentine induced by abrasion from mastication. The formative membrane was still adherent to these surfaces. The cementum was very much thicker about the end of this root than is normal in teeth of this age. This, no doubt, was due to the disturbance brought about by the attempt to extract the tooth."

This certainly goes to prove what some of us have been contending for years, regarding new formation of healthy tissue in pyorrhea pockets, and I believe science owes Dr. Fletcher a great deal for the light he has thrown on the subject.

Thank you, gentlemen, for the courtesy you have accorded me.

ANESTHESIA IN DENTAL SURGERY.

F. W. NAGLE, M.D.

Anesthetist to the Royal Victoria Hospital, Montreal.

Read before the Montreal Dental Club.

To Horace Wells, a dentist, who introduced nitrous oxide as an anesthetic in 1844, and to William T. G. Morton, his partner, who introduced ether in 1846, we owe the foundation of our present knowledge of anesthesia.

Anesthesia and antiseptics have made modern surgery possible. The general surgeon uses anesthetics in all cases where there is likely to be pain or shock; working on the sleeping patient he can proceed with facility, and the patient suffers no torture, physical or

mental. His patients invariably expect even the smallest operation to be done painlessly.

The dental surgeon, on the other hand, has only recently begun to take full advantage of his own discovery, and his patients have not yet learned to demand painless operations.

There are two reasons why anesthesia is so little used in dental surgery: (1) The want of proper accommodation for the preparation and recovery of patients; (2) the want of an agent which will produce anesthesia quickly and comfortably, afford the operator time and opportunity to do his work properly, and allow of a quick and smooth recovery. The first want is being filled rapidly; nearly all modern dental offices provide for the care of anesthetized patients. It is to a consideration of the second that the bulk of this paper is devoted.

No anesthetic agent is ideal.

Chloroform, while it is easy to give, pleasant to take, and not very unpleasant in its after effects, has been generally abandoned as too unsafe. In one year there were *reported* thirty chloroform deaths in dental chairs.

Ether gives too prolonged and uncomfortable an induction, is slowly eliminated, and generally causes post-operative nausea and vomiting.

Ethyl chloride, *ethyl bromide*, and their compounds, while quick in action, intermediate in safety between ether and chloroform, and not very disagreeable to take, do not give much time of available anesthesia. They permit at the most one minute for operating.

Nitrous-oxide, the oldest of our inhalation anesthetics, is more agreeable than those in the last class, is no more difficult to administer, is vastly safer, and allows the same time of available anesthesia.

Nitrous-oxide with oxygen was first used by Andrews, of Chicago, in 1868, but it is only now coming into general use.

In our lectures on anesthetics you and I were taught that nitrous oxide produced anesthesia by asphyxia, either internal or external. This was a mistake. It is true that the administration of pure nitrous oxide does produce asphyxia. The patient becomes cyanosed, the pupils are widely dilated, the eye-balls are fixed, the lids lie half open, the jaw is rigid, and the tongue and soft tissues of the mouth are swollen and congested, while jactitations, or clonic spasm of the limbs, appear. At the same time the breathing becomes labored and stertorous, and finally stops.

We were taught to regard these as the signs of nitrous-oxide anesthesia. They are also the true signs of asphyxia from any cause whatsoever.

By the addition of oxygen, which in itself is not an anesthetic, we do not increase the anesthetizing power of the nitrous-oxide. We simply remove the element of asphyxia and allow the anesthetic action of the gas to proceed uninterrupted. We find that

the patient's color remains good, the pupils contract as under other anesthetics, the eye-ball becomes fixed, the lids are closed and non-resistant, the muscles are relaxed, and jactitations or asphyxial movements take place.

If we now remove the inhaler, we have a time of available anesthesia slightly longer than if we had used nitrous oxide pure. We have also done away with the disconcerting, ghastly, bluish appearance of the patient under pure nitrous oxide, which is probably the chief objection to its use.

But this is not all. The combination of nitrous-oxide with oxygen, if applied continuously to the patient to the exclusion of air, has been found to serve for operations lasting up to several hours. I have used it for all kinds of operations, for over five hundred appendectomies, and in one pelvic case for four and a half hours.

But, you will say, of what use is this to the dental surgeon? How can he exclude air from his patients' lungs? This can be done by using a nasal inhaler, a small mask fitted accurately over the nose and held in place by a strap passing around the head. A tube leading from the gas apparatus carries the mixed gases *under pressure* into this mask, from which they are conveyed through the nasal passages into the pharynx. In spite of the fact that the patient's mouth is held widely open, he does not breathe through it. There are two reasons for this: (1) The mixture of gases being under a higher pressure than the atmosphere keeps the air from entering the pharynx. (2) The lower jaw, when depressed, prevents breathing through the mouth; in fact the wider you open a patient's mouth, the more inclined will he be to nose breathing.

In this way the operator secures a continuous flow of gas from air, while the whole mouth cavity is clear for his work. His time of available anesthesia is extended indefinitely. I have used this method in the dental chair for an operation lasting seventy-five minutes, but in practice about twenty minutes is long enough for one sitting.

The after effects are usually not uncomfortable and never dangerous. Fatigue is the chief complaint. About one case in five will vomit once, but will not feel nauseated afterward.

Recovery is very rapid. Consciousness returns in one or two minutes, whether the patient has been unconscious two or twenty minutes. This anesthetic has no cumulative action—a feature peculiar to itself.

The advantages of this agent will be obvious to every one. It is the safest anesthetic we have; it gives anesthesia quickly and pleasantly; allows of unlimited operating time, and has no serious, and very little unpleasant after effect. I think, therefore, that we are justified in considering it the most satisfactory anesthetic for dental operations.

Time does not permit of a consideration of the technique of

administration. The method is described in all modern text books on anesthesia. If any of your members care to discuss technical points, I shall be glad to do so with them.

There is one thing worthy of mention about the administration of nitrous-oxide with oxygen, which makes it especially valuable for dental operations. You can put your patient under or let him come out at will. In many cases the patient need not lose consciousness at all. He will be able to open and close his mouth, spit out, etc., and still feel no pain, although he may know which tooth you are operating upon. This is the ideal stage of anesthesia. It is dependent upon three factors: (1) the nervous constitution of the patient; (2) the skill of the administrator; (3) the amount of nerve tissue exposed at the site of operation.

DISCUSSION.

The discussion was opened by the President, Dr. H. Throsby, who spoke of the increasing popularity of N_2O+O as an anesthetic for dental operations.

Dr. T. D'Arcy Tansey: What inhaling apparatus do you use?

Dr. Nagle: I have used the Teter, the S. S. White, and the Gatch apparatus.

Dr. J. H. Springle: If asphyxia does not cause anesthesia under nitrous oxide, what does? What are the poisonous effects of nitrous oxide on the system compared with the effects of the other anesthetics? Why is nitrous-oxide-oxygen safer than other anesthetics?

Dr. Nagle: It has been proven clinically that we get anesthesia in the absence of asphyxia. Nobody knows definitely how anaesthesia is produced, but it is supposed to result from a loose chemical combination between the anesthetic agent and the abundant fat of the nerve cell.

Nitrous-oxide-oxygen is the lest poisonous of our anesthetics. It produces less anemia and less hemolysis than ether or chloroform, and produces no degenerative visceral changes. It is excreted unchanged as N_2O .

It is safest for the reasons just mentioned, and also because it is not a circulatory depressant. It has not irritating effect on the lungs or kidneys.

Dr. Walter G. Kennedy. What do you know of the Teter and the Coleman inhalers?

Dr. Nagle: The mask of the Teter nasal inhaler is made of rubber. The gases enter at the side. The Coleman nasal inhaler is all metal, and the gas is admitted to the mask from two tubes which open under the nostrils. The principle is the same.

Dr. Stanley Burns: What is the cause of post-operative vomiting after gas-oxygen anesthesia?

Dr. Nagle: Distension causing interference with the diaphragm's action, too tight clothing, mucus and saliva swallowed.

Dr. A. Clifford Jack: Have you ever noticed frontal headache after gas administration, and do you know its cause?

Dr. Nagle: Frontal headache is noticed chiefly in those cases in which asphyxia and heightened blood pressure are factors.

Dr. G. Guelph Armitage: Have you ever found it impossible to anesthetize anybody with gas?

Dr. Nagle: Not with the face inhaler, but with the nasal inhaler some cases have been very unsatisfactory, especially the earlier cases. In the first case a nasal inhaler was used which consisted of two tubes inserted into the patient's nostrils. This case had to be anesthetized with ether.

Dr. Chas. de Pencier: Does the saliva cause much trouble during anesthesia, and what provision do you make for its removal?

Dr. Nagle: It is troublesome, but by proper posturing of the patient it can be sponged from the front of the mouth, or drained by the ejector.

Dr. G. W. Oliver: There should be some judgment exercised in the selection of patients for this method. I find young children unsuitable.

Dr. Nagle: Most children, many women, and a few men are difficult cases for this method, but with increasing practice in its use these unsatisfactory cases become fewer.

Dr. F. M. Wells: Have you had any experience with somnoform and have you found it a safe anesthetic?

Dr. Nagle: I made a good trial of ethyl chloride and somnoform in the Nose and Throat Department of the Royal Victoria Hospital. We sought an agent which would be safe and would give sufficient time for the excision of adenoids and tonsils. The results were quick and deep anesthesia, a short time of available anesthesia (the longest was 95 seconds, obtained with ethyl chloride), and prompt recovery of consciousness. The after results were, however, not nearly as good as those of N_2O , while the sleep was in the average case only forty-five seconds. As to safety, I would refer Dr. Wells to the literature.

Dr. George Cameron discussed the advisability of heating the gases; the use of private N_2O plants, and the use of large gas cylinders.

Dr. Nagle: Heating the gas has been very successful in hospital work, and is always practised. I have tried it in dental practice, but have found that it produces more nausea than the cool gas. This may have been due to overheating. Large cylinders are much more economical and satisfactory for this work.

Dr. F. A. Stevenson discussed the cost of the anesthetic; mental pain; vomiting, and malaise.

Dr. Nagle: By the nasal method the cost is about ten cents per minute.

Many patients, of course, appear to be unduly sensitive to pain; nevertheless, it is very real to them, and it is to this very clause of

hypersensitive people that the method will prove the greatest blessing.

Vomiting and malaise after this anesthetic are negligible.

Dr. C. J. Conroy: What are the contra-indications to $N_2O + O$?

Dr. Nagle: Uncompensated heart lesions, especially myocarditis, and extreme grades of arteriosclerosis.

DISEASES OF THE MAXILLARY ANTRUM.

W. H. JAMIESON, M.D., MONTREAL, QUE.

Read before the Montreal Dental Club.

It will be my aim this evening to discuss the diseases of the antrum, and of these, acute and chronic suppuration being much the more common my remarks will be, in the main, devoted to their consideration. It is perhaps in the treatment of disease of the antrum that the dental surgeon and the rhinologist may most often co-operate to the advantage of the patient.

Owing to its anatomical relationship to the teeth, the antrum, besides being subject to infection from the nose, is also very liable to infection from the teeth, and consequently it is more often found diseased than any of the cranial sinuses and more commonly alone is it involved. Besides its anatomical position the antrum has other peculiarities. It is the largest of the cranial sinuses. It is never absent, though it may vary greatly in size, and it is the only sinus existing at birth, when it is seen as a mere slit-like indentation upon the outer wall of the nasal cavity. At this period the body of the superior maxilla consists almost entirely of the alveolar process, the sockets of the teeth being almost in contact with the orbital plate of the maxilla, forming the floor of the orbit.

As the superior maxilla develops an increase in the size of the face occurs. In the meantime there has been a process of formation and absorption of cancellous bone, thus causing an increase in the size of the antrum. This continues until the 25th year, when the antrum has reached its mature form with the eruption of the wisdom tooth or third molar.

It then consists of a pyramidal cavity lying entirely within the superior maxilla and communicates with the middle meatus of the nose through the ostium or natural opening lying in the Hiatus Semilunaris. This is frequently supplemented by an accessory opening and sometimes more than one. These are always high up from the floor, hence the rather poor natural drainage. It is lined with a thin muco-periosteum, on which is found an irregular distribution of ciliated columnar epithelium. According to Logan Turner, the average dimensions of a fully developed maxillary antrum are:—

Vertical height opposite first molar tooth, 3.5 cm. or about $1\frac{1}{2}$ in.

Transverse, 2.5 cm. or about 1 in.

Antero-posterior depth, 2.2. cm. or about $1\frac{1}{4}$ in.

There is no relationship between the size of the skull and antrum. The capacity of the antrum may vary from two drachms to one ounce. The floor of the antrum naturally bears an important relation to the teeth, and though direct communication between the root of a tooth and the mucous membrane of the cavity are not often met with, it is not infrequent that elevations are formed on the floor of the antrum by the projecting roots covered with a thin layer of bone. The osseous floor is usually thinnest over the sockets of the first and second molars and second bicuspid. When the cavity is unusually large the canine root may lie below the floor, but this is very exceptional. In an unusually small cavity the second and third molars are alone in relation to the floor and in a considerable proportion the second bicuspid lies just in front of the cavity. The roof presents one point of interest, the canal for the transmission of the infra-orbital nerve. This bony canal may not be complete and the nerve lies under the muco-periosteum, which may account for the intense neuralgic pains sometimes encountered in disease of the antrum.

ETIOLOGY.—The etiology of the inflammatory diseases of the accessory sinuses of the nose is largely influenced by those conditions which interfere with the efficient drainage and ventilation of these cavities, where ventilation and drainage are good, inflammation is rare unless the infection is virulent or where the resistance is lowered by some dyscrasia, such as syphilis or tuberculosis.

The presence of disease in a contiguous organ, as a carious tooth, may cause inflammation of a sinus, even though drainage and ventilation be good.

The etiology of antral sinusitis may be divided into predisposing and active or exciting. Among the predisposing causes constitutional diseases whereby the resisting power of the individual is lowered, play an important part. Nasal obstruction from deformities of the septum, hypertrophy of the turbinates, nasal polypi, etc., act by obstructing ventilation and drainage. Diseased teeth are also predisposing causes. The exciting cause of inflammation of the antrum is an infection which may be from the nose or of dental origin, and the history usually indicates which. If from the nose there is as a rule more than one sinus involved and the prognosis is not so good as in those of dental origin. Suppurative inflammation of the antrum is always due to infection, and may be caused:

- (1) By direct infection from the nose, as in cold in the head, pathogenic organisms of certain of the acute fevers, as influenza, etc,
- (2) Following operations on the nose. This is not common; I have never seen one, though Tilley reports two cases.
- (3) Carious teeth, usually situated below the floor, are a common cause, about 50 per cent. of the cases being due to this, infection of the antrum being brought about by an apical abscess on the root of the tooth, by a carious fistula or by way of the blood vessels or lymphatics and

from diseased bone in the neighborhood of a carious tooth. (4) Traumatism—fracture of bone from external injury or forcible extraction of a tooth. (5) One sinus may infect another.

Chronic inflammation of the maxillary antrum may be due to causes which hinder complete resolution, such as a debilitated state of health, nasal obstruction and catarrh, persisting sources of infection, as disease in another sinus, or the presence of a carious tooth.

Chronic antral disease may exist without there having been previous acute symptoms, the process being in these cases very insidious, and the evidence is abundant that many persons with diseased antra never seek professional advice on this account, the subjective symptoms being of so mild a nature. Thus, Kiar, in 195 post mortems on individuals who had died from various causes, found pus in 88 cases, the antrum being most commonly affected. Lapalle examined 169 bodies and found affections of the sinuses in 55, the antrum here also being the most frequently affected.

BACTERIOLOGY.—The infection is usually a mixed one, the three main organisms being, streptococci, pneumococci and staphylococci. Lewis and Turner have shown the presence in diseased antra of organisms commonly found in the mouth and occasionally a bacillus distinctive of dental caries.

Inflammation of the maxillary antrum may be acute or chronic:

1. (a) ACUTE.—There may or may not be a discharge from the nose on the affected side. If present this may be of a serious, mucous, muco-purulent, or purulent nature. It is often offensive and annoying to the patient in whom the sense of smell is usually good. On examination, it is seen to come from beneath the middle turbinate. As a rule, when the inflammation is at its height the discharge becomes scanty or may cease altogether owing to swelling of the nasal mucosa and consequent obstruction to drainage.

(b) A feeling of fulness or tenseness, accompanied by pain in the cheek of the affected side, aggravated by bending the head low, coughing or making any straining effort; there may be pain on pressure over the molar eminence within, some cases swelling. (Do not mistake a local periostitis for antral disease.) The neighboring teeth may ache. Headache is distressing and referred mostly to the supra-orbital region of that side. There is usually mental depression and difficulty in fixing the attention. The temperature may rise to 102 or 103°.

In the course of a few days the discharge may spontaneously evacuate itself into the nose with immediate relief to the patient, but if retention of the inflammatory products persist the symptoms become aggravated.

The prognosis is very favorable if of dental origin, less so if following influenza or other specific fevers.

After having made the diagnosis (the method by which this is accomplished will be described later on), our attention should be at once directed towards proper treatment of the case. Search

diligently for, and, where possible, remove the underlying cause, such as a diseased tooth, nasal obstruction, etc. Put the patient to bed and keep him there for a few days. A purgative will be of material benefit. Establish quickly free drainage. Applications of cocaine and adrenalin intra-nasally by reducing the swelling about the natural opening or openings, may be of great value in relieving the tension. A suction apparatus after the method of Sondermann, applied to the nostril, has been recommended by some.

For the pain, hot fomentations are in my opinion better than cold applications. Internally sedatives—phenacetin and caffeine nitrate, asperin; or, if pain very severe, morphine. If the symptoms are not promptly relieved by these means, puncture the antrum through the inferior meatus underneath the inferior turbinate and syringe with warm boracic solution or normal saline. This will nearly always give prompt relief and is often curative. It is much preferable to puncture through a tooth socket, as, by the use of cocaine (10 per cent.), applied with an applicator, the pain is as a rule insignificant; the procedure is not difficult and the risk of subsequent infection is much less.

2. CHRONIC SUPPURATION OF THE ANTRUM.—This may follow the acute form from causes already stated. Associated with this there is, as a general rule, an alteration in the lining membrane which is thickened as a result of a chronic congestion and round-celled infiltration; there is nearly always a swollen or edematous condition of the mucous membrane, polypoidal degeneration and formation of polypi are not uncommon, and granulation tissue is present where the mucous membrane has been destroyed.

SYMPTOMS.—(1) Unilateral nasal discharge, more or less copious, appearing beneath the middle turbinate, as a rule purulent and foul-smelling; this foul smell is more noticeable by the patient if the sense of smell, as is usually the case, is unimpaired. (2) Mental depression and aporexia, or difficulty in concentrating the attention—this more likely due to accompanying nasal obstruction. (3) Supra-orbital headache and pain, periodic in nature. (4) Liability to colds due to accompanying nasal obstruction. (5) Impairment of health due in part to swallowing of pus. (6) Alcohol is apt to have a bad effect on these cases.

DIAGNOSIS.—A careful intra-nasal examination is necessary, with the object not only of ascertaining whether there is disease of the antrum, but also to exclude, if possible, disease of other sinuses, as it is obvious that should such exist treatment of the antrum alone will be unsatisfactory. An equally careful examination of the teeth should be instituted, as a tooth apparently innocent looking may be the primary source of the trouble. Pressure over or below the malar prominence will, as a rule, elicit tenderness.

As aids to diagnosis of antral disease we have several very valuable methods, chief among these being the J-rays and puncture through the inner wall of the antrum beneath the inferior tur-

binate, followed by washing out of the cavity with warm boracic or normal saline solution. Transillumination by the method of voltoline, which requires a dark room for its successful operation, consists in introducing a small 10-volt lamp into the patient's mouth (after seeing that any plate, if present, is removed). If the antrum is diseased there will, as a rule, be a dark shadow beneath the eye of the affected side. On the other hand the healthy cheek will light up and there will be a clear red reflex beneath the eye, the pupil often showing red, and the patient will often see red in that eye. This method we have pretty well discarded, as it was by no means conclusive (being subject to several fallacies: (a) a shadow does not necessarily indicate the presence of pus, but may be present where the antrum is small, with thick walls; (b) sometimes when pus is present there is no shadow; (c) a cyst or polypi may give less shadow than the normal).

On the other hand, the X-Ray has proved to be of the greatest value, and, in any case where there is a suspicion of sinus disease, it is our rule, in hospital and private practice, to have a skiagraph made, and this in fact is done as a routine at the Royal Victoria Hospital when such indications are present. Where there is disease of a sinus there is a shadow or cloudiness over this sinus, and the outlines instead of being clear-cut are hazy.

In puncture of the antrum we have an absolutely certain means of knowing whether we are dealing with a diseased antrum, and unless there is a communication with the antrum, after the removal of a tooth, this should always be performed intra-nasally.

TREATMENT.—The treatment of chronic suppuration of the antrum may be divided into conservative and radical.

(1) *Conservatives* First examine carefully for and remove any predisposing causes, such as intra-nasal obstructions, which interfere with efficient drainage, remove any local focus of infection, have the teeth thoroughly examined. Treat any constitutional condition. Puncture through the inferior meatus and syringe out the cavity two or three times weekly, or even daily in some cases. Or a larger permanent opening may be made through the inner or nasal wall of the antrum where subsequent irrigation may be carried out and efficient drainage established. For irrigation we may use boracic acid, normal saline solution, carbolic acid, 1-60, sulphate of zinc, gr. i.—oz.; a weak solution of potassium permanganate is very good. The above treatment will suffice in many cases to effect a cure where the cause has been removed, where the degenerative changes of the mucosa have not been too extensive or where the patient can afford sufficient time to undergo prolonged treatment.

(2) *Radical Treatment*: When the condition is very chronic and marked, degenerative changes have taken place in the lining membrane more radical measures are indicated. These consist of operative interference either intra or extra-nasally, the object being to remove the diseased tissue and establish permanent and efficient drainage and ventilation.

The intra-nasal method consists in entering the antrum by way of the nose through the inner wall after removing a portion of the inferior turbinate. It has found favor especially among some operators in Europe and the United States, but its chief objection would seem to be that by this means complete inspection and cleaning out of the cavity is impossible.

A much better method is the extra-nasal, where we enter the antrum through the canine fossa, thoroughly clean out the cavity through an opening in the anterior wall sufficiently large to introduce the finger and through which a thorough view may be had of the interior. Make a large counter opening through the nasal wall as near the floor as possible, with or without removal of a portion of the anterior end of the inferior turbinate. No deformity results from these operations. The Caldwell-Lue, Kuster and Denker, are the three chief radical operations. There are, of course numerous modifications. The Beaman Douglas modification of Caldwell-Lue operation. Personally, I prefer the Caldwell-Lue operation.

I cannot conclude my remarks on the treatment of suppuration of the antrum without referring to another extra-nasal operation, this being the alveolar method of drainage, or perforation through an alveolus, subsequent treatment being carried out through this opening, which is kept patent by a solid plug or silver tube. This method was for a long time a popular one, especially in England, where it is still clung to by many. Tilley of London reports that of 27 cases drained by the alveolar route, 15 were obliged to use the tube and irrigation for from six months to ten years. Of these five were operated on later by the radical method, which was followed by complete cure. I myself know of one or two cases who had used the tube and irrigation for many months who had not to undergo a radical operation, but on being advised to remove the tube and allow the opening to close, did so with the result that the suppuration in the sinus ceased. A patient of mine, whom I occasionally see, but whose antrum I have not treated, has been using an alveolar plug attached to his dental plate. He has been using this for many years now, and there is still a purulent discharge entering his mouth and digestive tract, but because he suffers no great inconvenience is content to let things remain as they are. There must, in this case, be constant reinfection taking place from the mouth, and I cannot see how he can efficiently render the plug non-infective, as it is attached to a plate that cannot be boiled or otherwise made aseptic.

Personally, I am much opposed to the alveolar method of drainage and only enter the antrum by this route if there is strong presumptive evidence that there is a fistula leading into the antrum, or that diseased bone surrounds the alveolus, and then only for the purpose of clearing away the diseased tissue, subsequent treatment if necessary being carried on through a dependent opening intranasally of sufficient size for drainage and irrigation. Objections to

the alveolar method are: (1) It has no advantage over the intra-nasal; (2) is much more liable to reinfection from the mouth food; (3) pus draining from the antrum enters the mouth direct and is swallowed, and may cause marked digestive disturbances, while by the intra-nasal method if pus collects it may be removed by blowing the nose and need not enter the digestive tract to any extent. (4) It is not of any use in chronic cases, and (5) the results obtained are not good.

In conclusion, just a very few words concerning some other diseased conditions less frequently found in the antrum with some points of diagnostic importance: (1) Cysts there are of two classes.

1. Cysts due to degeneration of a mucous gland; these are very rare.

2. Dental cysts which may invade and distend the antral cavity; these are the more frequent form of antral cysts. I have removed such a cyst where the whole antral cavity was occupied by it, and was able to shell it out almost in its entirety.

SYMPTOMS OF ANTRAL CYST.—It is usually the recognition of a swelling under the cheek which alarms the patient. Pain is, as a rule, slight or absent. There may be considerable external deformity and the expansion of the inner antral wall may cause a narrowing of the nasal cavity, with resulting obstruction to nasal respiration. The bony walls of the antrum may be much thinner than normal in places, due to pressure and absorption; we may then get egg-shell crackling. The contents of such cysts are usually viscous, yellowish-green, non-fetid, and often show the presence of cholesterol crystals.

There is another rare condition which may be found invading the antrum, a specimen of which I have with me to-night, viz.: True odontoma of the maxillary antrum. Odontoma have been described by Hobl (in 1868) and by Sutton (Odontomes, Trans. of the Odontological Society, London, 1887) Uskoff, Schlœsmann, and others, who have been successful in extracting a number of cases from the literature, but nevertheless a true odontoma is very rare, especially when associated with an aberrant tooth in the antrum. For that reason I thought the exhibition of this specimen would be of interest to the President and members of this Association.

The history is, briefly, as follows: Male, aged 20, waiter; first came under my care July 2nd, 1909. Had been operated on on May 3rd for a supposed osteoma of the left superior maxilla. Four months previous to this he thought he had toothache and consulted a dentist, who extracted the left upper first bicuspid. This was followed by slight swelling for two or three days over the alveolar process at this point, was not painful, though slightly tender. There was no nasal discharge. On May 3rd, this mass was regarded as an osteoma and chiselled, but the antrum was not opened. Early in June the gum became tender over the site of the operation, followed by slight purulent discharge. When he came under my care

on July 2nd, 1909, the whole cheek was swollen and tender and there was a good sized swelling over the left alveolus just behind where the first bicuspid had been. This gave the sensation of a thin walled, bony cavity, as it had been loosened by the chiselling. In front of this was a discharging sinus leading to the maxillary antrum with thick purulent discharge. The X-Rays showed evidence of antral empyema and what appeared like a thickening of the lower lateral wall. The provisional diagnosis was antral empyema with dentigerous cyst.

Describe operation: Tissue from the Antrum of Highmore-Janelle. The tissue received consisted of a tooth whose base had the appearance of one of the molar group, and the roots were made up of four distinct limbs which were fused together into a wedge-shaped mass. The tooth measured 2.5 cm. in length, while the crown measured 1.2 x .75 cm. Immediately below the crown the tooth was surrounded by fleshy tissues not unlike the nature of the gums.

A second portion of the tissues consisted of a firm, bony-like mass measuring 3 x 2.5 x 1.5 cm., of oval shape, but with some irregular nodules about it. Here and there the bony mass was covered with a thin layer of soft tissue presenting a mucosal surface.

Besides this there were five smaller masses of soft tissues consisting of a pulpy mucosa with some blood clot. On the under surface of two of these portions was a thin shell of bone giving the tissue the appearance of having been removed from the surface of the main tumor mass. When the tumor was sawn in two the cut surface showed various radiating and glistening areas. The larger of these was rather wedge-shaped, in the centre of which was a soft tissue simulating the pulp of a tooth. Surrounding this pulp was a border 2 mm. wide, which was pearly-white, glistening, and extremely hard. The whole tumor was harder and more compact than ordinary bone. The solid tissue was semi-transparent. Examination of the decalcified tumor mass shows it to be made up of irregular pulp cavities surrounded by dentine. At the base of the tumor the pulp cavities are fairly large and contain a stroma supporting blood vessels and various types of cells. Along the outer margin of the pulp cavity and immediately adjoining the solid tissue is a layer of cells like osteoblasts (odontoblasts). The solid structures show a homogeneous matrix, in which are innumerable small canaliculi, but are devoid of cells. The fine channels run parallel to each other. Here and there this firm tissue has a coating of a structure looking like cementum. No true enamel structures are found in the solid tissues. Diagnosis—Odontoma of Antrum, Aberrant tooth.

Malignant growths are also met with involving the antrum, and are apt to expand the jaw (do not mistake for suppuration or cysts of the antrum). The following points will aid in the diagnosis:

	ANTRAL EMPYEMA.	CYST.	MALIGNANT DISEASES.
PAIN :	Sometime severe.	Slight or absent.	Severe of neuralgic type.
EXTERNAL DEFORM-			
ITY :	Not as a rule much.	Some swelling.	Sometimes swelling.
X-RAY :	X-Ray shadow.	X-Ray clearer.	Not clear outline.
ON EXPLORATION :	Purulent discharge.	Fluid contents-	No discharge and probably only a few drops of blood.

By conducting a careful examination mistakes in diagnosis are not likely to occur. For the treatment of cysts—the removal of the entire cyst wall by an operation similar to that for the cure of chronic suppuration of the antrum, is necessary to effect a certain cure.

L' A-B-C DE LA COCAINISATION DE LA PULPE DENTAIRE PAR PRESSION DIRECTE.

JOSEPH NOLIN, D.D.S., L.D.S., MONTREAL.

Travail lût devant la Société d'Ontologie de la Province de Québec.

La découverte en 1845, par le Dr. Spooner, de Montreal, de la mortification de la pulpe par l'arsenic, créa toute une révolution dans l'Art Dentaire. La conservation de milliers et de milliers de dents qui auraient auparavant été sacrifiées, fut rendue possible. Malgré ses imperfections, cette méthode de détruire la pulpe dentaire, est encote et restera longtemps en usage.

Aussi n'est-ce pas pour démolir la réputation de ce vieux et fidèle serviteur, que nous allons prôner une méthode plus moderne. Disions, dès le début, que, pour nous, il n'y a rien d'absolu dans l'art de guérir, tel remède, telle méthode, parfaitement effective dans un cas, aura des résultats désastreux dans un autre; telle autre, condamnée comme vieillie et démodée, rendra parfois des services inestimables.

Quand l'usage de la Cocaine commença à se répandre comme anesthésique local, vers 1883 ou 1884 je crois, toutes sortes d'expériences furent tentées pour en faire l'application à l'extirpation sans douleur de la pulpe. Nulles cependant ne furent couronnées de succès jusqu'à la découverte de la Cathaphorèse, en autant qu'elle s'applique au traitement des dents sensibles. Le Dr. P. Brown, de Montreal en fit l'application dès 1890, et le Dr. Gillette, un Américain, en perfection la technique en 1896. Je fus un des premiers en cette province, après le Dr. Brown, à faire l'essai de cette méthode. Elle eut des succès relatifs. La Cathaphorèse me rendit certainement de grands services. J'exerçais alors à la campagne, et le fait de pouvoir, en une seule séance, quelque longue qu'elle fut, anesthésier une pulpe, en faire l'ablation et remplir permanent le canal, était pour moi d'une valeur inestimable. Le grand

défaut de la Cathaphorèse est le temps qu'elle fait perdre, tant au client qu'à l'opérateur. Il m'est arrivé parfois de ne pouvoir produire l'anesthésie complète en moins d'une heure et plus, et jamais, dans les cas les plus favorables, en moins de 25 à 30 minutes. Aussi fallait-il dans la plupart des cas avoir recours quand même à l'Arsenic.

Il en est tout autrement de l'Anesthésie par pression directe. Elle est rapide, prenant rarement plus d'une minute et jamais plus de cinq; elle est effective; elle n'offre aucun danger sérieux, la Cocaine étant en dose minime et d'une application toute locale.

Voici en quoi consiste cette méthode:

Je suppose une canine supérieure qu'il faut couper pour en remplacer la couronne par une Richmond, à laquelle un pont sera attaché.

Je prends ce cas comme exemple, vu qu'il présente à peu près toutes les difficultés à vaincre pour l'ablation sans douleur d'une pulpe. Il n'y a, disons, aucune cavité sur la dent.

A l'aide d'une meule en carborundum on enlève d'abord l'émail du bout de la dent. Une fois l'ivoire dénudée, on forme une cavité, petite et profonde. A l'aide de fraises de plus grosses, on creuse la cavité, dans la direction de la pulpe, tant que la plus ou moins grande sensibilité de la dent le permet. Dans la plupart des cas on pourra, en opérant avec délicatesse, se rendre à moins d'un quart de ligne de la pulpe sans trop incommoder le patient. Dans ces cas, une seule application de cocaine suffit, et l'anesthésie s'obtient en moins d'une minute. Il va sans dire que la digue en caoutchouc a été appliquée et fixée avec soin. La cavité est d'abord lavée avec un liquide antiseptique. Il faut éviter les antiseptiques huileux, tel que la créosote, l'acide phénique, etc., qui rendent plus difficile la pénétration de la cocaine à travers les pores de la dent. La cavité est ensuite parfaitement asséchée à l'air chaud. Une goutte d'eau distillée et aseptisée est déposée au fond de la cavité à l'aide d'une sonde.

Il faut juste assez d'eau pour humecter légèrement le fond de la cavité. Un cristal de cocaine y est aussi déposé. Il se dissout immédiatement dans l'eau. Sur un morceau de verre on met une goutte d'eau que l'on sature de cocaine. Ou y trempe quelques fibres de coton absorbant, de quoi remplir un tiers de la cavité à peu près, que l'on place aussi au fond de la cavité. On prend ensuite un morceau de vulcanite, d'un quart de pouce par un demi pouce, que l'on plie en deux, pour le rendre plus épais. Ce morceau de caoutchouc est appliqué sur la cavité de façon à la recouvrir complètement. Avec un instrument en forme de boule, manche d'excavateur, brunissoir ou autre, on presse ensuite sur le caoutchouc de façon à faire pénétrer de force celui-ci dans la cavité, formant une sorte de pompe foulante. Si la cavité est bien fermée par le caoutchouc on verra le patient faire un geste indiquant qu'il

DOMINION DENTAL JOURNAL

ressent une légère douleur à apex. Il faut alors cesser d'augmenter la pression, sans cependant perdre de terrain. Au bout de trois ou quatre secondes (je dis *secondes*, pas *minutes*) on peut continuer d'augmenter la pression, jusqu'à ce qu'on y mette toute la force de la main. Cecil ne doit pas durer plus *trente secondes*.

Et c'est tout.

On peut immédiatement ouvrir largement le canal sans la moindre douleur au patient. Ceci fait, on extirpe immédiatement la pulpe à l'aide du tire-nerf de Donaldson. Il est amusant de voir l'expression d'ébahissement peinte sur la figure du patient quand on lui montre la pulpe de sa dent, si sensible au toucher quelques instants auparavant.

On trouve la pulpe absolument blanche, le sang en ayant été chassé vers l'apex de la racine. Une fois la pulpe enlevée, on attend quelques minutes qu'une certaine hémorrhagie se produise. On lave ensuite longuement avec de l'eau distillée, suivie d'une solution faible de Glyco-Thymoline. Il faut répéter ce lavage jusqu'à ce que toute trace d'hémorrhagie ait cessée de se manifester. On peut immédiatement procéder à l'obturation du canal, bien que nous préférons, quand le cas le permet, mettre un pausement à l'eucalitol et à l'iodoforme, sceller la cavité, et attendre au lendemain pour compléter le travail.

Une remarque en terminant. Ce système s'applique aux pulpes saines et non infectées seulement. Il ne faut jamais s'en servir, non plus dans un canal où il a été mis de l'arsenic. Ce serait courir au-devant d'un désastre assuré.

ELECTRICITY FOR DENTISTS.

FRANK D. PRICE, D.D.S.

CHAPTER V.

STORAGE BATTERIES.

Storage batteries are sometimes called SECONDARY BATTERIES or ACCUMULATORS. They are secondary in the sense that a primary current must first be sent through them to charge them. They are accumulators in that they appear to accumulate a charge or store of energy.

Almost any primary cell may be used as a storage cell. We have seen what chemical action takes place in the Leclanche cell. Suppose a Leclanche cell had been used until both the zinc and the sal-ammoniac had been largely decomposed and the liquid filled with zinc chloride. If a strong current be passed through the cell from the carbon to the zinc electrode that is opposite to the current produced by the cell, the action of the cell will then be reversed and

zinc will be deposited on the zinc rod. Thus will the cell be renewed. In this way dry cells, some of whose elements have become exhausted, are often renewed. But such cells as we have mentioned would not be very efficient as storage cells.

The electrodes in a storage cell are usually plates of lead modified with oxides of lead. The electrolyte in a lead plate cell is a solution of sulphuric acid, one part acid and four of water. To hold the lead oxide paste the surfaces of the lead plates are honey-combed or made with a succession of projecting shelves. The surface of the positive plate is filled with minion Pb_3O_4 made into a stiff paste with sulphuric acid solution and the surface of the negative plate with litharge (PbO) paste. In charging, a positive current is sent through the cell, entering by the positive plate. The litharge of the negative plate is reduced to spongy pure lead of a gray color. The minion of the positive plate is charged to peroxide of lead PbO_2 . Upon discharging, several chemical changes follow. The peroxide becomes monoxide PbO and by the action of the sulphuric acid a sulphate of lead PbSO_4 which forms in a thin white film over both plates. Each successive CHARGE thereafter may be represented thus:— $\text{PbSO}_4 + \text{H}_2\text{O} + \text{H}_2\text{SO}_4 + \text{PbO} = \text{PbO}_2 + \text{H}_2\text{SO}_4 + \text{Pb}$. During charge the acid becomes stronger. Each DISCHARGE may be thus represented:— $\text{PbO}_2 + 2\text{H}_2\text{SO}_4 + \text{Pb} = \text{PbO} + 2\text{H}_2\text{SO}_4 + \text{H}_2\text{O} + \text{PbSO}_4 = 2\text{PbSO}_4 + 2\text{H}_2\text{O} + \text{H}_2\text{SO}_4$, and the acid becomes weaker.

The working potential of a lead plate storage cell is about two volts. During CHARGE it rises to two and a half volts. The amperage is increased by having several positive and several negative plates in one cell. This is illustrated in Fig. 20. All the

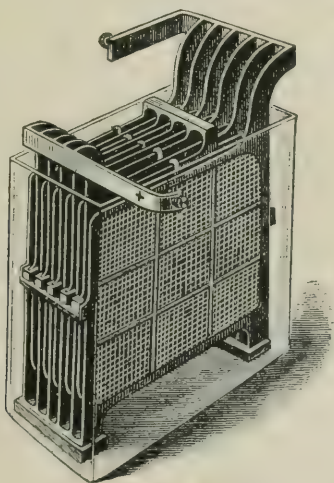


Fig. 20

positive plates are joined in parallel on one side, and all the negative plates in parallel on the other side. This is, in effect, as if

all the positive or negative were in single large plates, having the same working surface area as the several smaller plates together. The opposing plates are placed close together to reduce the resistance of the current through the electrolyte and to occupy small space. Each plate is usually insulated from its neighbor by rods of glass or vulcanite. The plates are raised above the bottom of the retaining jar so that if any paste falls down it will not form a short circuit.

A portable lead plate storage cell, such as is used for electric motor cars, usually has asbestos felt between the plates. The asbestos does not offer resistance to the current, and it absorbs the liquid, preventing it from dislodging the paste from the plates.

An amateur's storage battery is described as follows: Obtain lead pipes in two sizes, one of which will easily go inside the other without touching, say, two and one-half and three inches in diameter. Cut in lengths of about six inches. Wrap a piece of cloth on the smaller to make it nearly fit inside the larger, push it in and flatten both, so the smaller is about a half-inch inside in its small diameter. Remove the smaller and perforate it through the sides with small holes close together, and bend one end to close it. Solder a lead bottom on the larger pipe to not leak. Fasten lugs on the tops of each for leading out wires. Fill the smaller pipe with a stiff paste made of red lead (used by plumbers) and sulphuric acid solution. Put a piece of glass or rubber in the bottom of the larger lead pipe for insulation and stand in it on the glass, the smaller pipe now loaded with lead oxide paste. Stand slate pencils or glass rods around between the smaller and larger pipes for insulation. Nearly fill the cell thus formed with a solution of sulphuric acid and pour over the top melted paraffin or pitch. A cell formed in this way gives the same voltage as a large cell with multiple plates, but has a small amperage output. In assembling to form a battery, the outer lead cups must not touch each other, as they form the negative plates. They may be placed in a box with sawdust between. Connect the cells in series or multiple as desired. The cells should be charged by connecting the positive wire of the charging current to the wire leading out from the inside cups. Let the first charge be a long one. The battery must be charged and discharged a few times before it will reach its maximum efficiency.

Storage cells are made using other elements than we have described, but until recent years the lead plate storage cell has seemed the most efficient and satisfactory kind. Objections to it are found in its weight and in the danger from overcharging or over-discharging, or leaving idle for a long period of time. During charging there is a contraction, and during discharging an expansion of the surface of the plates, that tends to cause a warping of the plates. If by this means the plates of opposite polarity should touch each other the external circuit would be inoperative.

The capacity of a storage battery is measured in terms of AMPERE HOURS. A battery supplying 2 amperes for 50 hours would be called a 100-ampere-hour battery. Likewise would a battery supplying ten amperes for ten hours.

The electromotive force of the current charging must be greater than that of the battery. A battery of three cells in series supplying a six-volt current would need a current of not less than nine volts to charge it.

During 1910 Mr. Thomas A. Edison, who has done much for the electrical world, put on the market a storage cell that may revolutionize the storage battery proposition and simplify the supplying of electric energy in many places. A picture of the Edison cell of the B4 type is shown in Fig. 21. The Edison A cell is larger than the B cell, and is suitable for traction power. The 4 in the B4 indicates that the cell has 4 positive electrodes. The B4 would be a good size for dental use.

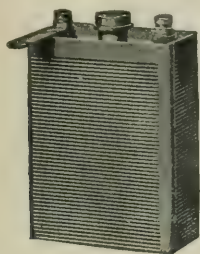


Fig. 21

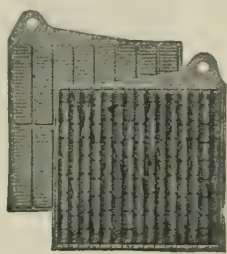


Fig. 22

The retaining can is made of steel, nickel-plated and corrugated on the sides to increase its rigidity. The positive or nickel plate consists of a collection of perforated steel tubes heavily nickel-plated and filled with alternate layers of nickel hydroxide and pure metallic nickel in very thin flakes. The type B has 15 tubes in one row. These tubes, after being filled, are held in perfect contact in a steel supporting frame or grid that is nickel-plated. In Fig. 22 the plate shown in front is an Edison positive plate. The negative or iron plate is also shown. It consists of a grid of cold rolled steel nickel-plated, holding a number of rectangular pockets with finely perforated sides and filled with powdered iron oxide. The type B plate contains 16 pockets in two horizontal rows. These plates are placed alternately, side by side in the can, and well insulated from each other and from the can by strips of hard rubber. The two outside plates are both negative, thus giving one more negative than positive plates.

The electrolyte consists of a 21 per cent. solution of potash, KOH, containing a small amount of lithium. In Fig. 21, the terminal posts for the leading out connections, and, in the center

of the cover, an opening for renewal of the electrolyte, are shown.

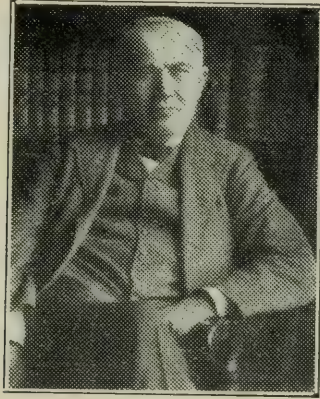
The working potential of the Edison cell is 1.2 volts. A group of five cells connected together in series in a box is shown in Fig. 23. This group would supply 6 volts, and has a capacity of 80 ampere hours. A current of at least 9.25 volts would be required for charging this battery. The charging current should be of 10 to 15 amperes.



Fig 23

A comparison between the common lead plate battery and the Edison battery should be in order here. The Edison cell weighs much less and in most cases occupies less space than a lead battery of same capacity. There is often difficulty in preventing the fumes of acid from the lead battery from corroding and destroying objects near it, especially metals. The alkaline electrolyte of the Edison cell does not corrode. Too rapid charging or discharging of the lead plates decreases the efficiency of the cell and often seriously injures the plates. This does not happen in the Edison cell. The Edison cell has shown itself to last five times as long as the lead plate cell, and to improve with age, while the lead plate cell depreciated. Lead plates are apt to buckle and short circuit; the Edison plates never do. Once in about 250 charges the electrolyte in the Edison cell needs renewing. In the lead plate cell it does much oftener. If overcharged or left for some time discharged the lead plates may become useless. This treatment does not injure the Edison cell. More than this might be said in favor of the Edison cell, as though the author had some interest in advertising it. The author has not the least interest in the Edison cell above any other, although he travelled many miles to see and investigate it. There may be other new storage cells superior to the Edison cell, but the author has no knowledge of them yet. The lead plate cell deserves our highest respect, for it has served us nobly. But we are convinced that with improved storage batteries will dawn a new era in the distribution and use

of electricity, and that the subject well merits careful consideration in such a work as this. To the humblest electrician even the name of Thomas A. Edison will ever be dear, and we count it a privilege to include his picture.



Thomas A. Edison

THOS. A. EDISON, THE WIZARD.

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VOL. XXIV

TORONTO, JANUARY 15, 1912

No. 1

THE CANADIAN PUBLIC HEALTH ASSOCIATION.

December 13, 14 and 15 the Canadian Public Health Association held its first annual meeting in Montreal. The organization meeting was held in Ottawa a year ago. The next meeting will be held in Toronto.

No national organization in Canada has ever gotten away to a better start. It has the sympathy, good will and support of every official governing body from the conservation commission to the township or village board of health. Besides this it has the support of every charitable organization, from the Anti-Tuberculosis Association to the Nursing Mission. Philanthropists the country over look to it as an organization which will direct and help in the proper expenditure of their givings. In fact, the association has the sympathy, good-will and support of every right-thinking Canadian. "Disraeli" said: "The public health is the foundation on which reposes the happiness of the people and the power of a nation."

The Governor-General the Duke of Connaught delivered the opening address, in which he pointed out the value of the work the association was undertaking, but especially directed his remarks to the value of vaccination as a means of preventing smallpox. This address will be published separately and distributed throughout Canada. Lord Strathcona is also a patron of the association, and by way of showing his sympathy sent the association a cheque for two thousand five hundred dollars. The Premier of Canada and the Minister of Agriculture were present, as well as the Premier of Quebec, and expressed their hearty sympathy with the work undertaken.

It is expected the Anti-Tuberculosis Association will unite with the Canadian Public Health Association as a section, and bring with it its annual grant of ten thousand dollars.

The association is organized on the plan of a general meeting and sections. Sections will discuss those subjects which are of special interest, but subjects which are of general interest will be discussed before the general sessions.

Public health officially in the past has had to do with sanitation, quarantine and immigration. The physician has had to do with curing disease. It has been nobody's business to educate the people how to prevent disease. What has been done in this direction has come through charitable organizations and philanthropy. It is the purpose of the Canadian Public Health Association to unite all these various elements which have the same purposes in view—to prolong life and increase happiness—so that their efforts may be more effective.

Is this association and its objects of interest to dentists or the dental profession? If the work of the dentist will increase happiness and prolong life by curing or preventing disease, then the dental profession should be interested in this organization.

Dentists are always willing to take their share of the responsibilities of citizenship, and in this case, if it can be shown that good will come from their co-operation and assistance, they will enthusiastically do their part.

THE CARPET BAG MAN.

There are several varieties of the species still living. Not all of them carry even a small bag. The carpet bag man of to-day is a species of peddler. He goes from city to city carrying his whole

worldly possessions with him. He pays no rent, pays no taxes on either real estate, business or income. He has no head office or warehouse or stake in the country in which he does business. Something like the Gypsy. He makes his living out of those about him. He is here to-day and gone to-morrow. He may be honest or dishonest, but is always financially irresponsible.

The carpet bag man who sells dental supplies in Canada is like the rest of the species. He has no stake in the country. He always sells specialties for cash. He may have one good article which helps to sell a lot of junk. He sells only such stuff as has a good margin of profit, leaving the standard articles to be supplied by the regular supply houses who carry the dentists' account for months before it is paid. The carpet bag man's goods are always guaranteed and warranted to be first-class. Every dentist he has seen for a week has bought from him and thus given his approval. But who could find him if his goods were a failure and if he were found what could be done with him for selling you an ounce of water flavored with thynol for two dollars?

There are several good reasons why dentists should discourage the carpet bag man. Nearly all such men in Canada come from the United States, and only bring with them what they expect to sell. They establish no agency here. They have no office. They have no financial standing. They contribute nothing to the country in which they do business.

It is unfair to the local dealers, who carry large stocks of goods and large amounts in book debts of the profession. The regular dealer fulfills all the requirements of citizenship while the carpet bag man does not. If the regular dealers goods do not suit us we return them.

It is not wise for a dentist to do business with an irresponsible person. He has no time to waste in speculation. His goods may be all right, but how can a dentist whose whole day is engaged by others give a stray peddler time to investigate what he has. If every dentist would lay down the rule that he would never buy anything from anybody that he had not previously intended to buy there would be less junk about dental offices and fewer peddlers about the country. It is a notable fact that professional men can be persuaded to buy almost anything, from fruit lands in Cuba to a pulp mummifier. If a dentist has practised for a year or two without a peddler's wonderful instrument or remedy he can surely get along for a few days until he can get it from a regular dealer. If his stuff is any good it will be obtainable in the regular way before long.

At the present time there are many carpet bag men in Canada, because business is a little dull in the United States and there is virgin soil here.

Proceedings of Dental Societies

NEW BRUNSWICK DENTAL ASSOCIATION.

(Continued from December issue)

There now being no unfinished business they proceeded to the new business.

Dr. C. A. Murray.—I believe that the Committee which is to report to-day is to report on the President's Address. That report is now ready if you will call upon the Secretary of the Committee, Dr. Barbour.

Dr. Barbour then read the report of the committee which was as follows:

Your Committee on the President's Address begs leave to report as follows:

Having carefully examined the contents, we desire to express our appreciation of the excellent points referred to and to congratulate the writer upon so successful an effort.

In this address the first point emphasized was specialization in dentistry, particularly along the lines of orthodontia. Recognizing the strength of the point of view respecting the general practitioner in this regard, we would recommend the following:

1. That a special committee be appointed to endeavour to promote and carry out a short course in orthodontia in some convenient place in the province and that such committee be empowered to act.

Your Committee recognizes that the necessity of antiseptics on the part of the dentist and this education of the public cannot be over-emphasized. Along this line of public education in dental health we would recommend:

1. That if possible public lectures in various communities be encouraged and that educational committees be selected in places of sufficient size to carry on a progressive educational campaign.

We are glad to note that the efforts to add dental teaching to hospital courses is meeting with success, and we look forward to the time, which should come in the near future, when dental infirmaries may be developed in at least a few of the larger cities.

Respectfully submitted,

(Sgd.) W. P. BRODERICK.

C. A. MURRAY.

F. W. BARBOUR.

July 12, 1911.

Dr. Manning.—I move that the report of the Committee on the President's Address be brought in and the different sections be brought up section by section for discussion.

This motion was seconded and carried.

Dr. Godsoe.—The first point emphasized was specialization in dentistry along the lines of orthodontia, particularly. Recognizing

the strength of the point of view respecting the general practitioner in this regard, we would recommend the following: That a special committee be appointed to endeavour to promote and carry out a short course in orthodontia at some convenient place in the province, and that such committee be empowered to act.

President.—We are ready for the discussion.

Dr. F. W. Barbour.—The idea the Committee had in view was the fact as emphasized that there are a very great number of dentists that recognize that there is nothing else that can be done for our patients who are suffering with this trouble. The effort that we can make ourselves is very limited with most of us, and what we have learned to a very great degree has been from experience. It did not seem impossible to us that through some effort and some little expenditure a man of more than general ability might be engaged to come to St. John for a few days to give special attention to this; not touching the complete course, but simply the general and minor work upon this line which would give us much better results. The idea in connection with this would be that the committee would find out if any such a person could be found who would be willing to give the course, and find out how this would be received by the dentists, and if enough encouragement could be secured to have it go through. The expenses to be paid by those who attend or some of it by the Society. This was the idea of the Committee.

President.—I think something along that line might be attempted. We would have to get the feeling of the dentists throughout the province. Are there any other remarks?

Dr. H. C. Wetmore.—I think the idea is a very good one, and hope the committee will take it in hand and work faithfully along, and I hope to see something along that line next year.

Dr. Broderick.—I feel that I ought to say a word. We have considered this matter very carefully and we have come to the conclusion that this was the only practical way that we could get the dentists educated along this line. I think this is a subject that every man should express an opinion on and now is the time for them to show their hand. I am interested in this question. I would like to know more about it. I have read about it myself, but this is unsatisfactory. I will be only too glad to avail myself of any such course.

Dr. Thomson.—I would like to make the suggestion that the Committee be made up of St. John dentists so that they can get together and talk it over. Get a committee of good men.

Dr. Leonard.—As one of the younger men, and realizing the fact that in the Colleges the cases themselves cover so long a time from the time of starting treatment to the result that in a practical way I do not know that we derived much information from the college course, I have no doubt that it would certainly be a good thing to have a man come here and give us a general idea along these lines, and I would co-operate to the best of my ability.

Dr. Murray.—As a member of that Committee I should like to say a few words. Dr. Barbour and Dr. Broderick have expressed our intentions very closely and our object is to bring this recommendation in. Of course, in the larger cities throughout the United States and Canada there are specialists for this work, and a great many of the general practitioners do not take it up; but in the smaller towns it is impossible for us to have specialists. All of us must be specialists on all subjects if we wish to keep up in our profession, and keep it in the high standing it calls for; and certainly we all have to do more or less of it, and it would certainly be a great benefit to us if we had a man to demonstrate this in some central point. St. John would be all right, and I for one would be very glad to avail myself of the opportunity of coming down here for a week or more and get all the information I can, because that is one of the subjects in which I feel I am not just exactly as efficient as I want to be. I move that a committee be appointed, selected from the profession in St. John. A committee of three to be appointed by the chair to take this in hand and carry it through, so that next year when we meet in Convention at Fredericton we will have very useful information to give to the Society.

Dr. L. Somers.—I have very much pleasure in seconding Dr. Murray's motion. If the committee feel that they have the Society back of them, it will do much toward the ultimate success of this movement; and the enthusiastic support of the Society will be sufficient inspiration for the committee to go ahead. I approve of that and also of the idea of having St. John dentists in the committee.

Dr. Barbour.—I move an amendment, namely, that the committee be empowered to repay or take care of any man we bring here any expenses or whatever money he has to pay out.

Dr. Manning.—That would be another motion.

Dr. Godsoe.—Might I ask if it is the intention of this committee to look into this matter and see if it is advisable to do so, and if they deem it advisable or otherwise to go ahead independent of the Society as a whole. Are they empowered to, in their judgment, put the Society under any expenses in connection with the matter?

President.—No.

Dr. Godsoe.—As I understand it then, the committee is to take this into consideration and procure a man, if they deem it advisable, who will come here to the city or some other place in the province and charge his fee, and the members who take advantage of the course pay the fee. There is to be no indebtedness to the Society?

President.—No.

Dr. Godsoe.—The Society is not responsible for anything?

President.—No, only the men who take the course.

Dr. Murray.—It is just a business proposition and it is this, that this committee be appointed, then they will communicate with other dentists in this province and see how many will take the

course if they can bring a man down here. Find out how much he will come for and how much it will be for each and every man that comes here to take the course. If the number that will come justifies them in bringing this man, let them bring him, using their own judgment. We do not intend to tax the Society.

Dr. Godsoe.—I wanted it clearly brought out.

Dr. McLean.—May I ask a question? Supposing this Committee in corresponding find that a certain number would agree to take the course. They find a man who would give this course for a fixed amount and the number agree to take it, and perhaps two-thirds of them turn up, what are they going to do?

Dr. Broderick.—I think that is very plain. If the Committee do not find they can pay a man to come here, they won't bring him here. We cannot do anything without authority from the Society in regard to the expenditure of money, but as regards our recommendations it will be in the power of the committee to make arrangements with a man and find out how much he would charge; then by getting the number of dentists who would come, we would know how to apportion the price.

Dr. Murray.—The case is this—suppose I intend to take the course, but at that time when the course comes up I am too busy and cannot come; if I pledge myself I should be held responsible. Let him who pledges himself pay for the course.

President.—It has been moved and seconded that a committee of men be appointed to undertake this work, to be of St. John dentists and appointed by the chair. Carried.

President.—I appoint Drs. Magee, Manning and Broderick.

Dr. Godsoe.—The second resolution is: Your committee recognizes that the necessity of antiseptics on the part of the dentist and this education of the public cannot be over-emphasized. Along the line of public education in dental health, we would recommend that if possible public lectures in various communities be encouraged and that educational committees be selected in places of sufficient size to carry on a progressive educational campaign. We are glad to note that the efforts to aid dental teaching to hospital nurses is meeting with success and we look forward to the time which should come in the near future when dental infirmaries may be developed in at least a few of the larger cities.

Dr. Barbour.—Now, about the school children and the hospitals. You know what we are doing in regard to the hospitals, we talked that over yesterday. I think that in regard to the appointment of a dentist on the Hospital Board to give lectures in the hospitals, that that is a matter that can be easily settled between the Hospital Board and the Medical Society.

In regard to the school children, we have received the consent of the school boards, who are going to allow us to lecture to the school children. I think the Society should try to do something like they do in different parts of the States. In the cities they have a man, whom they keep permanently, to give lectures. They have a

place for these lectures and he gives stereoptical views. The parents can come as well as the children and this keeps the parents talking. The parents like it. We find that education given to school children is but a vague idea to their parents, but these lectures and views are just what is needed. I think if the Society would appoint a committee to get a man to give these lectures it will help the work that is being done in the smaller towns.

Dr. Murray.—I think that is a very good point if we could accomplish it, but it would mean great expense. At the same time, we should not lose sight of the main object of educating the children. We have them from the 1st grade to the 11th grade in the High schools. We can give them lectures and teach them without any expense. If the local dentists will volunteer to go to the School Trustees they can get permission to give lectures. Then after that we might consider the other, but at the same time we should not stop going along and arranging for the lectures in schools. After we have educated the children in the public schools, then we can go further and deeper and have examinations, etc. We could have charts and give good lectures.

President.—Some good suggestions are being made along these lines. Something should be done in a systematic manner.

Dr. Somers.—This is a subject that I am very deeply interested in. That idea of Dr. Thomson's I think is a very excellent one. Of course, it is a matter for the Society to consider whether they would care to expend money that way just now. I understand you can get charts four feet large, that would be very excellent for preliminary work, and I feel with Dr. Murray that the local dentists are responsible for their particular village or town. I think there is a great weight upon the man who is all alone and perhaps he does not receive the sympathy even of the School Board. It is very slow up-hill work, but there is no reason why even one man should be discouraged. He is certain of the work placed upon him and to stimulate that man should be the work of this Society. Perhaps Dr. Thomson's method would be excellent—in the larger cities I think it would be an excellent idea, but I think the Committee should try to get together and get some results by combined efforts. In that way they can form some scheme and appear before the Board, and with these charts they can do excellent work with the children with the consent of the trustees. Of course, I hardly know how to work out Dr. Thomson's idea. It might be better to have a committee appointed. I move that a committee of three be appointed by the Chair to look into this matter and report next year.

Dr. McAvenny.—I move that the committee you appointed take up the whole of this and let them act. That is the only way to get on.

Dr. Broderick.—I think that is putting too much responsibility on these men. I think this is a more serious matter. There are some points in this recommendation that require a lot of considera-

tion, and I, as one member, do not feel that I would like to assume all the responsibility that would devolve on that committee on account of those recommendations. I do not think that is right at all. I think every man in the society should shoulder a little responsibility.

Dr. Manning.—I would like to second that motion of Dr. Somers' first. I think in regard to this other committee that it would be better not to have all St. John men. It is a larger work and a different work, and I think some of the other dentists in the province should help.

Mr. Windyier.—Since you are taking this question up, and if there is to be a committee appointed to take this matter up, I would like to say a word. I will, when I go back, be very glad to send down the charts that have been adopted by all cities in Western Canada and the United States. There is a very large number of charts, and I think in addition there are quite a large number of volumes of printed matter that is thoroughly acceptable to the leading dentists, and I think I could send you some of those. If you will take it up promptly and thoroughly, you can distribute this literature effectively. The set of charts could be forwarded from one section to another. I shall be very glad to send you down some of these. I could send you the literature and you can distribute it as you think best. I hope this will meet with your pleasure.

Dr. Murray.—Mr. President, I do not think we will have any trouble about this business. We have arranged in Moncton that at the commencement of next term we will make a start, and if these charts are available we would like to have the use of them. After we start we will be very glad to pass them along to the next town; and I am sure we are very grateful to Mr. Windyier, and as far as I am concerned the Society will be very glad to accept them.

President.—It has been moved and seconded, that the Chair appoint a special committee to deal with this matter. Carried.

President.—I appoint Drs. Somers, Thomson and Murray to take this matter in hand.

Dr. Murray.—As there is nothing else in that report that amounts to anything, I move that this report be accepted as a whole.

This was seconded and the motion carried.

Dr. Murray.—I move that we proceed to the election of officers before dinner, as after dinner we have some very important papers to come up, which are very instructive as well as entertaining.

This motion was seconded and carried.

President.—We are now open for the nomination of a President.

Dr. Murray.—I have much pleasure in nominating the Vice-President to the position of President, that is Dr. F. C. Bonnell.

This motion was seconded by Dr. Leonard and carried.

Dr. Barbour.—I move for Vice-President, Dr. Thomson of Moncton.

Seconded and carried.

It was moved, seconded and carried that Dr. Godsoe be elected Secretary-Treasurer.

President.—We are now ready for nominations for members to the Council. The retiring representatives to the Council are: Drs. J. M. Magee, W. P. Broderick, E. R. Sewell and F. A. Godsoe.

Dr. Godsoe.—I would suggest, Mr. President, that before you proceed to this election you will appoint two scrutineers who will act.

President.—I appoint Drs. H. Murray and Wetmore as Scrutineers. We are now open for nominations for members of the Council.

Dr. C. A. Murray.—I have much pleasure in nominating as a representative to the Council one of our oldest members and I refer to Dr. L. Somers of Moncton. I do not think it is necessary to have this nomination seconded.

The other members of the Council are Drs. McAvenny, Murray and Sproule appointed by the Government. At present all the elective members come from St. John.

Dr. Manning nominated Dr. H. C. Wetmore, and other nominations were Dr. F. A. Godsoe, Dr. W. P. Broderick, Dr. F. W. Barbour, Dr. Manning and Dr. J. M. Magee, and they then proceeded to ballot.

Dr. H. Murray.—Mr. President, we find twenty-one votes cast as follows: Dr. L. Somers, 18; Dr. H. C. Wetmore, 14; Dr. F. A. Godsoe, 12; Dr. Manning, 11; Dr. W. P. Broderick, 10; Dr. F. W. Barbour, 9; Dr. J. M. Magee, 7.

Out of the twenty-one votes cast it is necessary to have eleven for election for choice; therefore, Dr. Somers, Wetmore, Godsoe and Manning are elected.

President.—I declare Drs. Somers, Wetmore, Godsoe and Manning elected to the Council for the ensuing year.

Dr. Godsoe.—Mr. President, it is getting near one o'clock and the next order of business will take up considerable time. It may be the wish of the meeting to take it up after recess. We have some very interesting papers this afternoon, and we could all be back by 2.30 o'clock. There is a very interesting paper by Dr. Hicks, and we have a talk from Dr. Sawyer who is here with us from Manchester, New Hampshire, also a very fine paper by Dr. McAvenny. All turn up early and we will get through early.

On motion the meeting adjourned until 2.30.

July 12th, 1911.

The adjourned meeting was called to order at 3 p.m. and proceeded to business.

Mr. Hart.—Our new President will now take the chair, and I will retire. I just want to say that I thank you all for the attention you have given me so far and also for the honor of placing me

in this position last year. I appreciate it very much and hope I shall be able to do something for the meeting that we will have later.

Dr. Bonnell.—I thank you very much for electing me to this position. I assure you I will do all I can to uphold the interests of the Society, and I feel sure that with the able assistance of my friend, Dr. Thomson, we will be able to make next year's meeting a big success.

The first thing we will take up will be Dr. Hick's paper.

Dr. Hicks then read Dr. Belyea's paper on "A New Arrangement of Teeth and Plumpers in Artificial Denture," by Dr. F. S. Belyea, of Brookline, Mass., which he read before the American Academy of Dental Science.

Dr. F. C. Bonnell.—I am sure I voice the sentiments of all present in saying that Dr. Belyea should be congratulated upon his excellent paper. We should like to hear from anybody here who has any remarks to make on this paper.

Dr. L. Somers.—I am sure the paper was a very great treat to us, coming from a man of Dr. Belyea's well known experience. As a true account of the way he has taken in the art of sculpture in trying to restore the human expression, it is very interesting to us; and when he says that he invariably gets results in his cases we have something to go by. We have seen his methods and it is certainly something we should think well of and make some efforts to get the same results. No man has gone into it from the standpoint that Dr. Belyea has and he has not only been kind enough to give us his theory in the matter, but has also given us practical aid in the form of a clinic, and while it is certainly entirely different we feel when he says that he invariably gets results along those lines that we shall certainly try in the future to bring that expert knowledge that he has given us into actual practice. I would like to move that the Secretary of the Society would kindly write to Dr. Belyea. I move a vote of thanks to Dr. Belyea and Dr. Hicks, to be tendered by the Secretary, and also to acknowledge his kind offer to come down.

This motion was seconded and carried.

Dr. C. A. Murray.—I cannot say anything that has not already been said, but I might add that I am very glad to hear this paper, as there are a great many suggestions in it that would do us a lot of good; but still, at the same time, I almost think I have seen cases where you could not get—where it would be almost impossible to get—perfect results by the waxing up of some of those mouths; and in other cases I know it would be all right, we could get perfectly good results from them. I might say that I have had real benefit from this, and no doubt we will go home and try this method, and it will certainly do us a certain amount of good. I may say that I feel very much gratified personally that Dr. Belyea has done this: I know him, and I am glad to say he is also a New Bruns-

wick boy; I think from Woodstock, and we feel quite closely connected with him; and next year I know, if he is reminded by Dr. Barbour of his promise, that we will have the pleasure of having Dr. Belyea down here himself.

Dr. Barbour.—It has just occurred to me that we might put this matter to test before waiting for him. If we have any friends with whom we are especially intimate we might try this artificial treatment and get an idea, and then perhaps Dr. Belyea would give us his story and also our own experience would help. It is very hard to realize the thing, but experience teaches, and I am sure he does not speak without experience. I know what he says he means, and we ought to have enough confidence in this to repeat it.

Dr. Bonnell.—The next is a discussion by Dr. Godsoe.

Dr. Godsoe.—I think this must be a mistake. I have not given the matter any thought, and I do not think I would be qualified to give it to you intelligently without giving it some thought. If you have any others that could do so, I would like you to call on them, but there are other things that we have before this meeting, and I would suggest that this be left aside for the present at all events, and some other subject taken up in its stead. We have a gentleman here whom we are all glad to see; a gentleman who was with us some thirteen or fourteen years ago. It was when we had a meeting with the Nova Scotia Society held in Digby and we are exceedingly glad to have him with us again. As he has not as yet been introduced to this meeting, I feel that he should be introduced, and if you will allow me I have great pleasure in introducing Dr. Sawyer, of Manchester, who has a paper of exceptional interest to us all. From his former remarks before this body, I feel sure you will all appreciate what he has said, and I would move that the courtesies of this Society be extended to Dr. Sawyer for the balance of our session and that he be cordially invited to give this paper. I believe he has come here through the courtesy or the instrumentality of the S. S. White Dental Manufacturing Company of Boston. Mr. Horton is here. I feel very grateful to the White people for bringing him here, for I know he will give us something interesting.

Dr. C. A. Murray.—I think all that Dr. Godsoe has said in regard to Dr. Sawyer, of Manchester, is true. I might say that Dr. Sawyer is one of the men who is impressed upon my mind. I think thirteen years ago we had the pleasure of hearing him give a clinic in the Maritime Dental meeting at Digby, N.S., and I was so impressed with the way he manipulated his work that it has ever since that been fresh in my memory, and this morning I at once recognized him and recollected to my mind the operation which he did at Digby; and I am sure as a Society and as individuals we are more than glad to have Dr. Sawyer with us to-day and I hope that his visit here will be pleasant and I know as he goes on to

Nova Scotia through New Brunswick and sees our beautiful province—which I am very sorry he is going through in the night—he will appreciate his visit in this province by the sea; and I know that the Nova Scotia people will give him the same cordial welcome that we do here. I have great pleasure in seconding Dr. Godsoe's motion, and we feel very grateful to Mr. Horton and to the S. S. White people for inducing Dr. Sawyer to be with us.

President.—I am sure we were all pleased to hear Dr. Sawyer's talk, and I think we will all go away from this meeting impressed with what he has demonstrated to us. We are very, very grateful to you, Dr. Sawyer. Now we will call on Dr. McAvenny for his paper on the "Early Days of Dentistry."

Dr. McAvenny then read a paper on the "Early History of Dentistry in New Brunswick."

President.—I am sure we are very grateful to Dr. McAvenny for this paper and he is to be congratulated upon it.

Dr. C. A. Murray.—I think it is deserving of any eulogy or anything that is favorable to Dr. McAvenny. I am very sorry that the paper was not read earlier so that the other members could have heard it. I am sure it has taken a great deal of the doctor's time and trouble in securing these dates and formulating it in the manner in which he has, and it is not only instructive, but it will be a matter of history to be handed down after we have passed out. I consider it a very valuable document. He has gone back to the very early dates and named all the pioneers of dentistry, and it is a historical paper and one which we will be very glad to preserve. I have been associated with him ever since this Society was started and I do not believe there has been a meeting when he has not been here. He has always taken a very active part and I do not think anything too honorable can be said of Dr. McAvenny. Now, I am sure we can all sympathize with the doctor's feelings when speaking of old time friends. I am sure it touched me sitting listening to him and I am sure it touched him, and I am sure he has our sincere sympathy as it recalls very many reminiscences of the past. We appreciate his efforts, and I am sure, Mr. President, that I voice the sentiments of every member that we are very grateful to him for this paper that he has given us. It is one that will be handed down in this Society as a mark of history. It will be a memorial to the doctor in times to come.

Dr. Manning.—I would like to say this further. I would like to see that the list as read this afternoon be preserved in the minutes of our Association in some way. Perhaps not in full, perhaps in copy. These things might be wanted for reference, and it might not be possible otherwise to get them.

Dr. Godsoe.—I want to get the sanction of this Society, Mr. President, to allow me to make a donation to the janitor as usual. There is never any specified amount, but \$2.00 was given at the last place.

Dr. Manning.—I move that the janitor be granted a fee of \$2.00 for his services.

This motion was seconded by Dr. McAvenny and carried.

Dr. Godsoe.—I have not as yet received a certified copy of the amendment to the Dental Act, but expect to soon. I would ask that the Society sanction me having copies printed and sent to every member in the province.

Dr. Leonard.—I make a motion that a copy of the amendment of this act be sent to each individual dentist in the province. Seconded by Dr. Murray and carried.

President.—Gentlemen, I do not think there is anything further and I am sure that we have all enjoyed this meeting very, very much, and it is to be regretted that more did not stay until the last minute; but, however, you will have a very enjoyable convention at Fredericton next year, and I hope to see you all there. Just before we close I have several committees to appoint. For the Audit Committee I appoint: Dr. Sancton, Dr. Otto Nase and Dr. W. P. Bonnell.

Entertainment Committee.—Dr. F. W. Barbour, Chairman, Dr. Croker, Dr. McMurray.

Exhibit Committee.—Dr. Crocker, Dr. McMurray, Dr. Steeves.

Clinic Committee.—Dr. F. W. Barbour, Dr. Thomson, Dr. Burden.

Paper Committee.—Dr. C. A. Murray, Dr. W. P. Broderick, Dr. Crocker.

Dr. Murray.—I would like to make a motion. I have very much pleasure in making a motion to the effect that the Society extend our sincere thanks and gratitude to the local dentists of this city and particularly the Entertainment Committee for their kindness and hospitality towards the visiting members. I am sure we had a most delightful time yesterday afternoon, and all this must have cost a lot of time and expense. So I have much pleasure in making this motion.

This motion was seconded and carried.

President.—I am sure we have done the very best we could to entertain you. It was not as good as they have done in Moncton, but we are very glad and feel repaid for our humble efforts.

On motion meeting adjourned. F. A. GODSOE, Secretary.

Editorial Notes

D. S. G. Perry, New York, died Dec. 22, 1911.

Dr. McCartney, Caston, Alta., spent the holiday season in the east.

Dr. Hope, of Edmonton, R.C.D.S., 1910, was in Toronto in December.

Dr. F. L. Bass, Banff, Alta., was married in Napanee during the holiday season.

Dr. Archie Johnson, Hartney, Man., was married at Strathroy, Ont., in December, 1911.



Dr. F. J. Conboy who was elected chairman of the Board of Education, Toronto, for 1912.

Dr. W. B. Steed, Nelson, B.C., addressed the Women's Institute on the care of teeth, December 4, 1911.

Dr. W. D. Cowan, of Regina, was a visitor in Toronto recently. He had come east to accompany his family home, who had been visiting his father's people in Guelph.

Dr. G. A. McDonald, Yorkton, Man., was a visitor at the last meeting of the Toronto Dental Society.

The annual meeting of the Canadian Prophylactic Association was held Jan. 8th, 1912, Toronto, Ont.

Dr. C. C. Lumley, was elected chairman of the Finance Committee of the Board of Education, St. Thomas.

Dr. E. W. Honsinger, St. Thomas, was elected chairman of the Building and Grounds Committee.

The following dentists were elected in the recent elections.

F. E. Bennett and C. E. Lumley, Board of Education, St. Thomas.

W. R. Greene, Alderman, Ottawa.

G. H. Campbell, Reeve, Orangeville.

G. T. Wilson, Deputy Reeve, Perth.

P. T. Coupland, Counsellor, St. Mary's.

W. F. Colter, Deputy Reeve, Sarnia.

S. J. Sims, Reeve, Fenelon Falls.

BRODIE MEMORIAL.

There is money being collected for a memorial to the memory of the late William Brodie. The intention is to place a life size painting of Dr. Brodie in the Dental College building, Toronto. This appeal should commend itself to every Canadian dentist, and especially those resident in Ontario where Dr. Brodie's work is best known. Dr. Eaton will be pleased to receive donations for the purpose. It is not intended that large sums shall be subscribed, but rather that a great number show their appreciation of scientific work done in a line outside of the Dental field. Dr. Brodie's work is known wherever botany and etymology are known. Canadians have here a chance to honor one of their own great men.

Additional donations—

J. A. Bothwell, Toronto, \$1.00.

J. H. Irwin, Collingwood, \$2.00.

T. F. Campbell, Galt, \$1.00.

Dominion Dental Journal

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No. 2

Original Communications

SEPSIS OF THE MOUTH OR MICROBIC CONDITIONS CAUSED BY INSOLUBLE TOOTH POWDERS.

F. MALCOLM WELLS, D.D.S., MONTREAL, QUE.

Read before the Montreal Dental Club.

If a theory explains many facts otherwise obscure, it is not thereby proved to be true. This effect has small weight if the theory has no other support, but if it rests on carefully observed facts, the circumstances that it harmonizes and elucidates does increase the probability that it is true. Sometimes, therefore, it is worth while to consider this effect alone, if we are careful not to mistake it for proof or give more weight to it than is just. It does the service, also, of directing attention to the more important features of the problems concerned.

You know the change that has taken place among medical men, and the growing interest and attention which oral sepsis is given in the columns of their journals.

It is not necessary for me to recite the line of evils that a septic mouth may bring in its train, you know their variety and gravity, and daily their tale increases. Dr. Hunter, as you all know, devoted to it a large portion of his address at the opening of the session of the Faculty of Medicine of McGill University, Montreal, October 3rd, 1910.

It was discussed by the dental section of the British Medical Association at the last annual meeting in London, and also at the British Dental Association annual meeting last August, after a very able paper read by J. H. Badcock.

Dr. W. Hunter, already mentioned, says:

"What I desire to impress upon you students, and all the students entering the profession, and all those already engaged in the practice of the profession, is 'not a matter of teeth and dentistry,' it is an all-important matter of sepsis and antisepsis that concerns every branch of the community. It is not a simple matter

of 'neglect of the teeth' by the patient, as it is so commonly stated; but one of neglect of a great infection by the profession—a great infective disease for which the patient is not primarily responsible any more than he is responsible for the contraction of typhoid fever or tuberculosis. The condition referred to is that to which I have given the name of 'Oral Sepsis.' The second subject was to emphasize the importance of the infection caused by staphylococcal and streptococcal organisms, as distinguished from the purely saphrophytic infection in which the mouth abounds, on the temporary presence of specific organisms, e.g., typhoid fever, tuberculosis, pneumonia, etc.

"The subject of oral sepsis, as I designated and defined it, namely, the septic lesions of streptococcal and staphylococcal infection found in the mouth, belongs to no one department of medicine or surgery. It is common ground on which the general doctor, physician or surgeon, the throat, nose and ear and eye specialist, specialists in children's diseases, in stomach diseases, in blood diseases, in 'rheumatic' diseases, in fevers, in skin diseases, in nerves and mental diseases, and lastly the dental surgeon, all rest on terms of equal responsibility.

"In its earlier manifestations, no special knowledge is required to deal with it. A sound grasp of the principals underlying anti-sepsis alone is required. Unfortunately, for the patient, it is precisely this grasp which I grieve to say is wanting, and that the future of oral pathology and treatment, and, therefore, practical dentistry, depends upon the extent to which those who occupy themselves with these subjects are trained in the principles and impregnated with a fundamental truth of oral sepsis and oral anti-septics, and to gold-cap a healthy or diseased tooth in order to beautify or preserve (?) it is a veritable apotheosis of septic surgery, and of surgical and medical malpractice."

The inference derived is that crown and bridge work should be indiscriminately condemned, for want of knowledge, the good with the bad.

We know these statements are erroneous, but coming from men of authority, they will find wide acceptance.

Their slight acquaintance with dental pathology and their total ignorance of dental technique renders them unable to distinguish what is valuable and what is pernicious. Because a very great proportion of the crowns and bridges are found to be septic in a greater or less degree, they conclude that all must necessarily be so. They class together the work of the conscientious practitioner and the ignorant charlatan. Moreover, they fall into the all too common error of judging the achievements of the past by the standards of the present. As knowledge grows methods of practice must change to conform with it. Until recent years, the danger of sepsis was not appreciated, but once realized, there is no reason

why, in suitable cases, crowns and bridges should not be made as clean and as easily cleansible as natural and healthy teeth, and their potential cleanliness recognized as the criterion of their suitability for any individual case.

This matter of oral sepsis is, therefore, of urgent importance in relation to the whole multifarious and widespread group of affections—medical, surgical, and dental, caused by the actual presence of toxic action of pyogenic organisms (staphylococci and streptococci) and beyond all shadow of doubt, the time has fully come when a general and complete overhaul of the dental curriculum in all the universities and in every dental school in America is urgently necessary. There can also be little doubt that the reconstruction must be carried out upon the lines laid down by the European schools.

Do crowns and caps immunize the teeth from decay? Experiments were undertaken by Miller to determine whether defects in the form and structure of the tooth influenced the process of caries. He found that abrasions, bruises, cracks and any other defects, very sensibly diminished the resistance of the enamel and dentine. Deep fissures and all the defects in the enamel which furnish a lodging place for food, naturally render the tooth at these points more susceptible to caries. Moreover, one of the chief and main difficulties in discussing the whole problem is the attempt to explain the process of dental caries without having a regard to the importance of several rather than a single predisposing cause. The explanations advanced by several observers are none of them sufficient (*per se*) to elucidate the problem in its entirety, but, taken together, a very good working hypothesis may be obtained. Dental caries is not a specific disease due to a certain specific micro-organism. It is no definite 'entity,' but a process occurring through the operation of certain biological and physical laws.

Miller, Thomas and Black estimated the percentage composition of a large number of teeth, and found that there was no appreciable variation, and that there was no evidence that the instance of caries could be associated with the decrease in the percentage of the lime salts present. It is known, however, from an empirical point of view that some teeth are apparently more liable to the inroads of bacteria than are others, although the researches just cited show that the susceptibility to caries does not lie in the lime salt content.

It will be noticed that the acid produced by the organisms require to be neutralized from time to time. Otherwise, owing to the increased acidity of the fluid, the organisms cease their activity, the very acid produced acting as a check to the growth of the bacteria producing it. It is possible that small quantities of acid frequently applied to the teeth may produce microscopical irregularities, or, what is more important, solution of the interprismatic substance of the enamel prisms, or of the axial portions of those prisms,

assisting in the adherence of organisms and forming microscopical points of entrance, from which portals the process may extend.

On the other hand, we must not forget that some people are in the habit of consuming acid fruits, as in the case of the Sicilians, and it is conceivable that the acid may act as a protective by preventing the development of acid forming organisms, or dissolving away the outer layers of the enamel, and with it the contained bacteria, or the secondary dentine, etc., including the pulp chamber, before the process had threatened that cavity. Such an obliteration is common in old skulls, with great denudation of the dentine.

NOTE.—Dr. Leon Williams tells us that the Sicilians, who are particularly free from caries, are large consumers of lemon.

However, as before stated, we are as yet unable to venture on any positive statements as regards tooth decay, but this we know: first, that all fundamental experiments show that oral fermentation is the result of bacterial action; second, that tooth decay, pyorrhea, etc., is not caused by any one species of micro-organism, and it is not the presence of this or that kind of bacteria, but rather the joint activity of the total flora as expressed in intensity of fermentation in food particles which determine the extent of caries, etc.; third, that if the teeth and mouth are cleaned properly, it is the best known means of securing immunity from caries and keeping a healthy mouth.

This brings me to the second part of my remarks.

It will undoubtedly be easier to render the subject clearer if we, in the first place, briefly summarize the clinical features of the insoluble powder, and afterwards describe the facts elicited by bacteriological investigation. The information thus obtained will allow us to compare the different systems presented with those described by recent observers, and you shall then be in a position to state your conclusions more definitely:—

1. Solubo is a perfectly soluble powder and slightly alkaline in its action: there is no gritty or strongly irritating substances used to prepare the powder, and, as soon as moistened, eliminates oxygen gas. It removes the tartar or dental plaques in a harmless manner, and will not injure the teeth or the living cell matter of the mucous membrane.

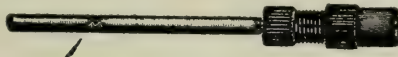
2. The basis of mouth hygiene is the avoidance of stagnation. Every insoluble tooth powder used introduces a possibility of stagnation, and its use is of the nature of a compromise in which the claims of beauty and the necessity of removing the tartar and stains from the surface of the teeth are weighed against those of cleanliness. Far too often, and especially so in the case of crowns, gold caps and bridge-work, cleanliness finds no place in the final settlement.

A FEW USES TO WHICH DETACHED POST CROWNS AND SIMILARLY CONSTRUCTED PORCELAIN TEETH MAY BE PUT.

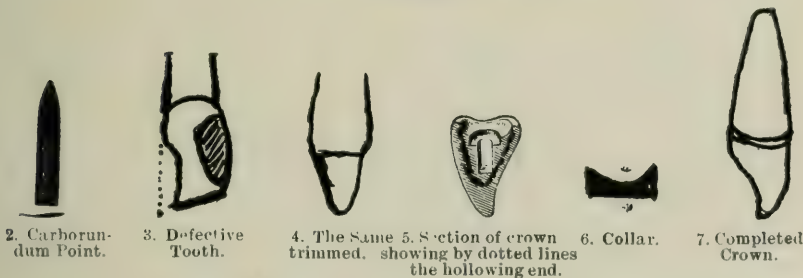
A. J. SAWYER, D.D.S., MANCHESTER, N.H.

Clinic at the New Brunswick Dental Association, July 1911.

First:—We have, say, a central incisor, with vital pulp, but so badly disfigured, unchecked caries on one side and a disgraceful filling on the other, that no alternative save crowning is left the owner. We first trim the tooth as if for a restoration of a "porcelain hood" baked on the platinum matrix, but, instead of making the "hood" in that way we select a detached post crown suitable to the case, and with a No. 13 carborundum point set in screwmandrel No. 307 we grind out the interior of the crown until it slips easily over the stump and well under the gum in front. We then place a disc of wax, with its centre cut away, over the conical stump, pressing it beneath the gum, and, placing the hollowed out crown in position, while the wax is still somewhat soft, press it home. This produces a wax cap and band, which we reproduce in gold by means of the casting process. When trimmed and polished we cement it in place, using the hood portion to guide it into perfect relationship with the root. Allowing a few minutes for the cement to harden, we then cement the hood portion, and our operation is completed.



1. Screw Mandrel.



2. Carborundum Point.

3. Defective Tooth.

4. The Same 5. Section of crown trimmed, showing by dotted lines the hollowing end.

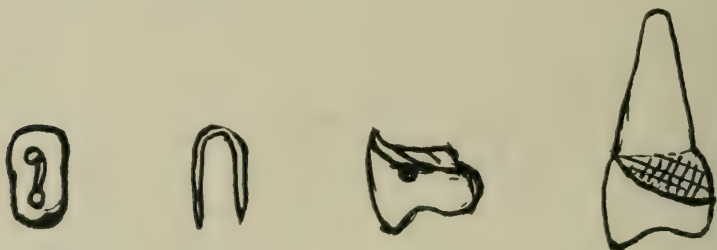
6. Collar.

7. Completed Crown.

Second:—Suppose we have a bicuspid stump broken somewhat above the gum line. We fix a staple post in the canals, the wire before bending having been roughened by rolling between two sharp files, and adapt a detached post crown or what is preferable in this case, a "diatoric" bicuspid, similarly as we adapted the incisor, only in this instance we purposely grind the tooth away so it will not fit the stump lingually, and, in case the tooth selected should not have holes through the sides, we grind a "shoulder" from one side to the other lingually. Then, using a piece of inlay wax sufficiently large to restore all deficiencies of contour, we place the

staple post in the stump and press the crown to its correct alignment and occlusion. We then remove the crown, wax and post together, and, attaching a sprue wire to the wax, invest the whole, and cast gold to replace the wax.

Anyone who has experimented with porcelain will have discovered that, when fusing, it has properties similar to glass, in that it may be spun to a fine thread if an instrument is stuck into it in this particular state. Now, the nearer porcelain may be brought to the fusing point so much the less fragile is it, and, therefore, in order to cast gold around and onto porcelain we must heat our mould and its contents until the sprue hole shows quite red. *Pure gold must be used for casting to porcelain.* Alloyed gold, owing to its contracting, will fracture a crown of this nature.



8. Face of Bicuspid Stump.

9. Staple Post.

10. Diastoric Tooth.

11. Finished Crown.

Third:—Molars carious to the gum line may be restored by securing anchorage in a somewhat different way. Owing to the greater size of the stump, a "box" preparation may be made. Then, after a crown has been fitted, a wax restoration is made from which gold is cast into the hollow crown. The gold being polished, the completed crown is then set with cement. Should the bite be too short, or should aesthetic effect not be essential, an all-gold crown may be cast from a wax restoration, and cemented into place.



12. Finished Molar Crown, dotted lines showing the gold in crown and also in "box" preparation of stump.

Fourth:—We have an incisor stump upon which we either cannot adjust, or do not want, a band. We prepare the stump and adjust a post. With a cone-shaped bur we cut a depression on the face of the stump between the canal and the lingual gum. This leaves a perpendicular side next the canal. A detached post crown having been adapted, wax is pressed around the post, and over the whole stump end, depression and all, and the crown forced home.

We now remove the crown, and cast 22Kt. (light, gold, that is, gold alloyed only with silver) to embrace the post. When polished it is first set (using as in the case of the first described example, the "hood," to ensure perfect apposition) and afterward we set the "hood."



13. Section of stumps showing depression.

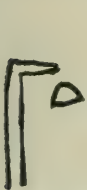


14. Face of same showing depression.



15. Section of Crown and of gold case around post and showing the projection of gold to fit into depression cut in face of stump.

Fifth:—We occasionally have an emergency call to insert a crown of some sort in a few minutes. We approximately fit a detached post crown, little care being essential further than to see that it is the correct shade and width. Silicate cement is placed in a considerable mass around the post and into the depression in the crown; the post is thrust through a piece of thin rubber dam (to prevent the cement coming in contact with the wet end of the stump), and then forced to its correct position, and held there until the silicate has set. A few minutes with a garnet disc will effect an exact root contour, as the outline of the root will have been distinctly marked, when it may be set with either gutta percha or cement as the exigency of the case may determine.



16. Home made trimming instrument.



17. Prepared stump a—a measurement point.



18. Collar and crown plate with brad through opening and engaging in investment material.



19. Section of crown plate (dark) and collar (light) as well as post, assembled ready for setting.

Sixth:—The best crown of all is constructed as follows:—

The stump is trimmed with a considerable taper well under the gum line with a special-shaped instrument (home-made) having two cutting sides, which act like planes for shaving off the dentine. Bend an old instrument sharply at right angles, for about 1-8 or 3-16 of an inch, make a three-sided tapering point of the part bent over. Make the top angle blunt, so it will slip under and not wound the gum, and make the side angles as sharp as razors. A single trial will demonstrate its efficiency and its superiority over any other kind of trimming instrument for this purpose. Having the stump trimmed, a measurement is made of the smallest cir-

cumference and a 22 kt. band is made. This is driven tightly on to the tapering stump. It stretches and hugs the stump, much the tighter the farther it is driven up. When properly fitted, both tooth end and gold are together, cut well above the gum line in front. A post and crown are adjusted. We remove band and crown and burnish 30-gauge pure gold to the root face of the crown. (This we will call the crown plate.) With sticky wax stick the crown plate and the collar together in as correct relationship as guesswork will allow, and, while it is still *tacky*, assemble all the parts and, pressing firmly *home*, hold it until the wax is hard. Now the band and crown plate are to be soldered together with 22 kt. solder with the following detail: The investing material being applied, a small brad is pushed through the opening and the investment engages it, and both band and crown plate. The brad serves the double purpose of holding the parts together and of facilitating the handling of such a small article while soldering since it can be turned round and round, so ensuring a thorough filling in the space between the two pieces of gold. Polish gold and set in the case of the first described cision.



20. Outline of tooth showing proximal face to be cut away



21. Outline showing occlusal surface to be cut away.



22. Plate stuck up for occlusal and proximal surfaces.



23. Outline of proximal plate (dotted line) behind occlusal plate with pins attached.

Seventh:—How shall we supply a missing first bicuspid where the teeth on each side are perfectly sound and aesthetic conditions must be considered?

The following will describe an almost ideal restoration: First grind the occlusal surface of the second bicuspid, to allow for a thickness of perhaps gauge 20 gold, and flatten the proximal surface. From a plaster impression of the tooth make a Mellotte metal die, and swage 30 gauge pure gold to fit its prepared surfaces. Now adjust the swaged plate, having punched small holes opposite the anterior and posterior extremities of the sulcus, and through these holes drill pits into the tooth. Platinum tooth pins are adjusted, stuck with wax and soldered with 22 kt. solder; 18 kt. solder is now sweated onto the occlusal portion. An impression of the parts being taken with the gold in position, a dummy or "*Pontic*" is adjusted and soldered. The finished attachment when set pre-

sents a most satisfactory appearance, and while frailty might pos-



24. Outline of finished piece with dotted line to indicate the natural tooth.

sibly be considered its chief characteristic, actual practice has demonstrated it to be exceedingly strong and serviceable.

ELECTRICITY FOR DENTISTS.

FRANK D. PRICE, D.D.S., TORONTO.

Chapter V. Continued.

CHARGING STORAGE BATTERIES.

In charging it is apparent that a *continuous* current must be used, that is, a current continuously in one direction. It is also called *direct* current, abbreviated to D.C. The positive wire of the charging current must be connected to the positive plate of the battery. If not marked, the positive plate of the battery will be seen to be darker than the negative plate. A galvanometer may be used to determine the positive and negative wires of the charging current. Another method is to saturate a piece of litmus with water and touch the litmus with the two charging wires placed an

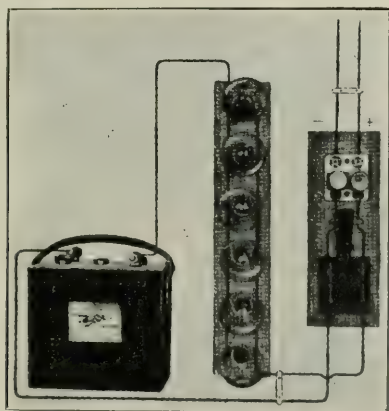


FIG. 24. CHARGING BATTERY FROM 110 VOLT D.C.

inch or so apart. The litmus will turn blue at the positive wire and red at the negative. Another method is to saturate a piece of

blotting paper with a solution of potassium iodide. A dark stain of iodine will appear at the positive wire.

The first commercial supply of electric energy to towns and cities was in nearly all cases the continuous current, as that seemed easiest to control. Current for domestic use is usually supplied at a pressure of 110 to 120 volts. To charge a dental storage battery with this current it is well to insert a number of 32 candle lamps in multiple together and in series with the battery, as suggested by Fig. 24. Each lamp will pass about one ampere, so that the six lamps in say five hours would furnish the battery with nearly 30 ampere hours capacity. Some allowance must be made for resistance in the wire conductors and in the battery. But it may be seen how that by adding or deducting lamps in multiple any desired amount of electricity may be supplied.

In many towns there is an arc lighting system used at night only. The drop at potential at each arc lamp is about 45 volts. If, therefore, a wire be led off the line from each side of an arc lamp and carried to the storage battery, it will afford a 45 volt supply at an amperage inversely as the resistance of the storage battery. Fig. 25 will illustrate the connections. A device must be included for

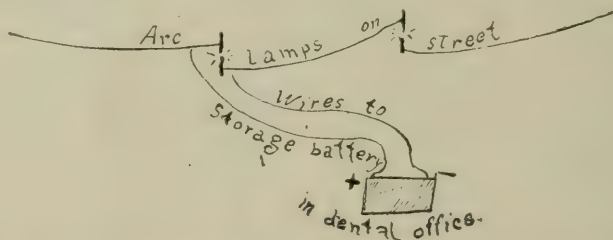


FIG. 25. CONNECTIONS FROM ARC LIGHTING CIRCUIT TO DENTAL OFFICE.

turning off the supply current when the battery is sufficiently charged. One method is to have a time regulator after the manner of the time regulator on the vulcanizer, and an electro-magnet to throw the current on the battery when the current is turned on the street lamps. If the current is on the street lamps before the dentist leaves his office he may turn it on his battery instead of having the electro-magnet do it. The reason for not having the street lines connected with the battery when the arc lamps are not burning is that when an arc lamp is not burning there is a short circuit at the lamp, with practically no resistance. This, therefore, would furnish a complete circuit around which the storage battery would soon discharge itself.

A cut-in switch is illustrated in Fig. 26. A is an *electro-magnet* such as described in the chapter on electro-magnetism. It should be wound with about No. 28 copper insulated wire. One of the wires from the street is connected directly to one end of the magnet winding as at b. The other end of the magnet wire, c, connects a ten

candle lamp in series with the other wire from the street. From b a wire is led to f to make contact with e. From the armature, e, a wire is led toward the battery. When the current is turned on the street lamps it also passes the magnet coil and lamp as indicated

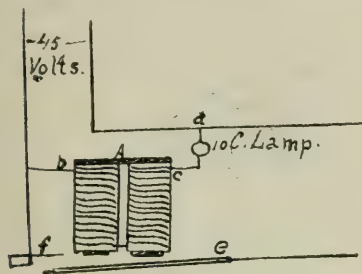


FIG. 26.

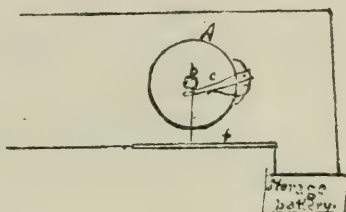


FIG. 27.

and the armature is drawn tightly against the spring plate f. This offers an easy path to the battery. When the street current is turned off to extinguish the arc lamps the supply to the battery ceases. The electro-magnet is inoperative because its resistance and that of the lamp are too great for the low voltage of the storage battery and the armature falls away from f.

A time cut-out is also shown in Fig. 27, connected in series with the cut-in switch, Fig. 26. A represents a clock and b a screw thread on the shaft of the minute hand. C is a lever pivoted at the side of the clock and furnished with a spring to throw it up when released from the screw b. The screw must be a left-hand thread to move the lever c outward from the clock. A cord joins the lever c to the pivoted switch f. Each hour the lever c will be moved one screw thread, so that by counting screw threads from the end the lever c can be set to be released at any desired time, thus breaking contact at f. A storage battery of any considerable capacity would not need any time cut-out because the amperage of the arc lighting circuit is usually low and it would need all night, unless during the long nights of winter, to charge the battery.

In later years as greater distances are being traversed and as machinery is being improved the *alternating current* (abbreviated A.C.) is being generally adopted. The reason of this will appear in a later chapter. The alternating current, as its name suggests, rapidly alternates its direction or polarity. It will be apparent that if an alternating current were sent through a storage battery the first impulse would produce a certain amount of chemical action and the reverse current would immediately undo it. Various means are used to change the alternating to direct current. One method is by a *motor generator*. This, as its name suggests, is a combination of motor to receive the alternating current and which by its rotation drives a dynamo. The dynamo is constructed to generate a

continuous current of the desired voltage. These two machines may be in separate coils together on the same axle or they may be separated at a little distance, the same axle that receives the power from the motor delivers it to the dynamo, as in Fig. 28, or they may be separated, each axle having a pulley between which the power is

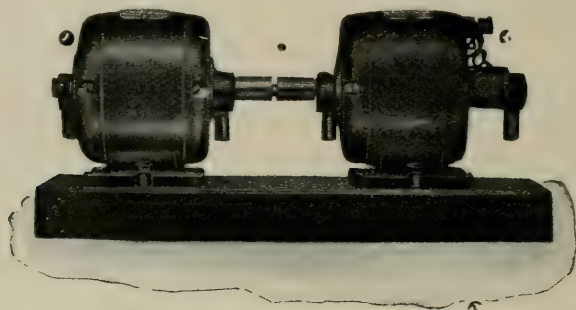


FIG. 28. MOTOR GENERATOR.

carried by a belt. The *generator* delivers a proper current for charging the storage battery. It may also supply current for other uses. If the motor is belted to the generator, the belting may be to other machinery instead and the power used also for other purposes.

A simple and a common but not very efficient instrument for changing the A.C. to D.C. is called the *electrolytic rectifier*. It consists of a jar containing a solution of potassium hydrate slightly acid. One electrode is lead and the other aluminum. The cell should be connected in series with a rheostat and the storage battery. The size of the jar and of the electrodes must be proportioned to the amperage to be delivered through it, not to allow of much resistance, and therefore of heat and loss. If the alternating current be less than 200 volts and the cell cool, the current will pass in only one direction, from the lead to the aluminum. This action is claimed to be due to a skin of aluminum hydrate on the surface of the aluminum anode. It must be noted that the alternating current in one direction, that which will not pass through the rectifier, is lost, hence the lack of efficiency of the instrument. The direct current delivered is pulsating and not suitable for some kinds of therapeutic work. The cell will work about 500 hours, after which the aluminum and the electrolyte should be renewed. A more efficient rectifier is made by placing two rectifier cells in multiple on the A.C. line connecting one aluminum and one lead plate of each cell on the same line. The pulsation in one direction is passed by one of the cells and in the opposite direction by the other cell.

A popular instrument for *rectifying* the alternating to direct current is the *mercury arc rectifier*. The essential elements consist of the rectifier tube and a reactance coil to continue the electric arc

in the tube. Other accessories are a transformer or resistance coils to control the discharge direct current from the tube. Fig. 29 illustrates a mercury arc rectifier tube made by the General Electric Company. It consists of a closed glass bulb from which the air has been exhausted. A and A show where connections are made leading to two carbon electrodes called the *anodes* or positive electrodes. At B is the negative electrode or *cathode*, consisting of a

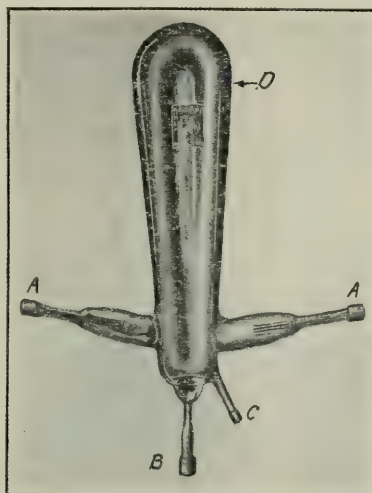
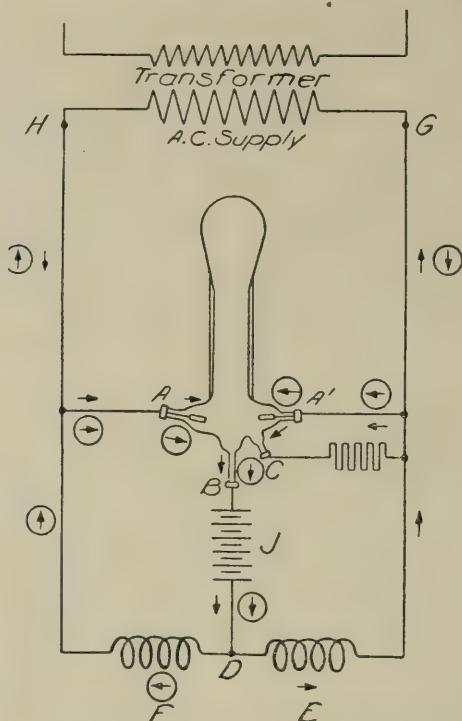


FIG. 29. RECTIFIER TUBE.

small well of mercury. A small electrode, C, connected to one side of the alternating current is used for starting the arc. A slight tilting of the tube makes a mercury bridge between B and C. When the tube returns to the direct position the bridge is broken, causing an arc. A diagram of the connections is shown in Fig. 30. The theory is as follows: In an exhausted tube having a mercury electrode, ionized vapor is supplied by the mercury electrode (cathode) when it is in a state of excitation. This condition can be continued only as long as there is a current toward the cathode. If the direction of the current is reversed so that the mercury electrode now becomes positive, the current ceases to flow, since in order to flow in the opposite direction there would have to be a new mercury electrode. Therefore the current is always kept flowing in one direction, and that toward the mercury cathode, which is kept excited by the current itself. Such a tube would cease to operate on an alternating current if some means were not provided to maintain a continuous flow toward the mercury cathode. This is provided by the reactances. In diagram 30, both wires H and G of the alternating current are shown to be connected to the anodes A and A of the tube. A second connection is made from one side through a resistance coil to the electrode C. Both wires H and G are also

connected through the reactance coils F and E to one side of the storage battery J. The other side of the storage battery is connected to the cathode B. The arrows show the current flowing



ELEMENTARY DIAGRAM OF CONNECTIONS

FIG. 30. CONNECTIONS TO RECTIFIER.

through the battery from B to D. The reactances act like discharging condensers, keeping the tube excited. As the current alternates first one anode A and then the other becomes positive and there is a continuous flow of current toward the cathode, thence through the battery and back to the other side through a reactance. The reactance, by discharging, acts against the counter electromotive force of the storage battery and keeps the tube excited until the voltage of the line is restored to normal at each alternation. A rectifier set is shown in Fig. 31 of a size suitable for charging dental storage batteries. The reactance and resistance coils are on the back of the panel. Switches for connecting the alternating, the direct and the starting currents are shown near the bottom. A handle above the tube is for tilting the tube to start the arc. Makers of mercury arc rectifiers give directions for their installation and care suited to the special design of each outfit.

A new rectifier being placed on the market by Mr. Edison may

be described as follows: A small moter driven by the alternating current rotates synchronically or in unison with the *cycles* of the alternating current. The motor causes a commutator to rotate,

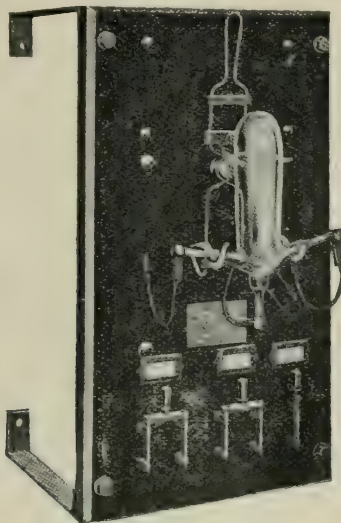


FIG. 31. SMALL RECTIFIER PANEL.

which synthetically picks up each positive impulse from the alternating current and carries it out on one brush and picks up each negative impulse and carries it out on another brush. Fig. 32 shows the principle of the commutator. A and B are two contact brushes that slide on the brass rings a and b, which respectively are connected to the commutator segments a' and b'. Therefore whatever current A carries is communicated to a' and whatever current B carries is delivered to b'. The commutator revolves at such speed that while A is positive a' is touching the brush e. At the same time B is negative and is in communication with brush f. At the change of cycle when A and B are neutral before they have exchanged their polarities the insulations c and d are passing under the brushes e and f. And by the time b comes under the brush e, B has become positive and delivers its positive electricity to e. At the same time A has become negative and is delivering the negative to brush f. Thus, while A and B change their polarities or the direction of the current 25 to 60 times a second, e is always positive and f negative, and so are delivering a direct current. This machine promises to be the cheapest and most efficient rectifier yet invented. If the alternating current A B be 110 volts, as ordinarily supplied to consumers, then the direct current e f would also be 110 volts.

As storage batteries become more common for vehicular use, it is expected that at convenient centres throughout the country there

will be garages for charging storage batteries or perhaps for exchanging charged for discharged batteries. These centres will be as essential in the community as the store or the bank, and batteries for all kinds of domestic use will be charged there cheaply. The

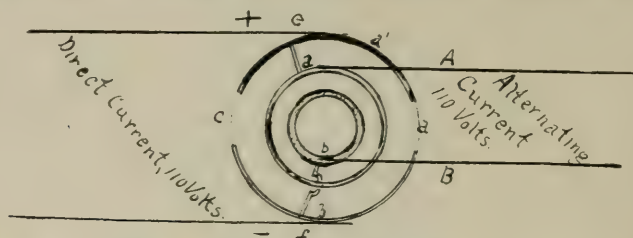


FIG. 32. RECTIFYING COMMUTATOR DRIVEN BY SYNCHRONOUS MOTOR.

dentist will telephone the nearest centre and in a few minutes an electric delivery car will be at his door to leave a fresh battery for him and to get his discharged battery to be re-charged.

A further treatment of simple methods of charging storage batteries will be considered in the chapter on Independent Plants.

THE CHICAGO DENTAL SOCIETY MEETING AND MEETING OF THE INSTITUTE OF DENTAL PEDAGOGICS.

REPORTED BY A. W. THORNTON, D.D.S., TORONTO, ONT.

Is thirteen an unlucky number? Were there thirteen in our party, or only nine? These are questions that very frequently arose as a party of thirteen (or nine) travelled to Chicago to attend the combined meetings of the Chicago Dental Association and the Association of Dental Teachers.

To make things plain, let it be said that there were nine members of the faculty of the R. C. D. S. and four "better halves," but as the preacher had said "they twain will become one flesh," it is still a disputed point whether "we were nine or thirteen." The railroad company had no difficulty in determining the matter so far as they were concerned, as they insisted on thirteen tickets, and the four fortunate "other halves" always had the pleasure of paying for "two" meals in the dining car or restaurant. So perhaps we were thirteen.

It's one thing to secure a berth in a sleeper; it's quite another thing to obtain a night's rest. Just what penalty should be meted out to a man who "snores" is a matter not easily determined; but I would suggest that such men should be compelled to go with "shaved" heads and "unshaved" faces until they cease all such vile, sleep-dispelling practices. However, in spite of the "unlucky" thirteen and the "deep, musical breathing" which made sleep out

of the question, the week spent in Chicago will be long and pleasantly remembered.

Monday was "manufacturers' day," and was simply another evidence of the wonderful perfection to which the manufacture of dental goods has attained and the desire of the manufacturers to give to the dentists of this continent the best that it is possible to produce.

Among the newer and more ingenious contrivances might be mentioned a combined Bunsen burner and blowpipe, a "measure" for mercury and alloy, and a method of "mixing" the amalgam so that it never comes in contact with the hands or fingers; a new casting machine, combining the principle of the vacuum and direct pressure machines; an automatic tongue depressor and substitute (in many cases) for the rubber dam; etc., etc.

Chairs and engines; sterilizers and switchboards; lathes and compressed air pumps, inhalers and syringes, with many other desirable (and some very undesirable) instruments were there to please the eye, fire the imagination, and (incidentally) empty the purse.

Tuesday was "clinic" day and the "crowds" were there.

"Prophylaxis" was very much to the front, although perhaps not so much attention was given to this phase of practice as was evident at the Cleveland meeting. Among the many splints and other devices shown for the retention of loose teeth, perhaps none attracted more attention, or was more favorably commented upon, than the one devised and shown by Dr. Andrew J. McDonagh of Toronto.

In the "operative" section there was perhaps just a little less attention given to "cast" work, and foil gold, crystal gold, amalgam and "silicates" were more in evidence.

But if casting has in any degree decreased in operative dentistry, it has grown very considerably in prosthetic dentistry. Cast aluminum seems to be a very popular base for dentures, and cast crowns and bridges were much in evidence.

A most interesting feature of the meeting was Dr. Wm. E. Bebb's (Los Angeles, Cal.) exhibit of a private collection of animal skulls and skins. This is said to be the largest private collection in the world, and Dr. Bebb is an enthusiast. Unlike some enthusiasts, however, he is modest and unassuming, and if he rides a "hobby" he does not try to monopolize the whole road. His collection, lecture and lantern slides were simply a revelation to the uninitiated.

On Wednesday morning, January 24th, the nineteenth annual meeting of the Institute of Dental Pedagogics opened in the Red Room of the La Salle Hotel. An address of welcome was given by Chicago's Medical Health Inspector, and this was followed by the splendid address of the President, Dr. Don. M. Gallie. The address was perhaps one of the best to which the members of the Institute ever listened, such an address indeed as one would expect from "Don." Gallie—strong, forceful, suggestive and constructive.

The discussion of the address was opened by Dr. A. W. Thornton of Toronto. Dr. J. D. Patterson, Kansas City, Mo., and Dr. W. Clyde Davis, Lincoln, Neb., followed; and throughout the whole of the discussion it was abundantly evident that the members of the Institute "do their own thinking."

On Wednesday at noon all the Canadians were entertained at luncheon by Dr. C. N. Johnson. In the absence of Mrs. Johnson (who was in Toronto), Miss Johnson did the honors as hostess, and every lady present said to every man present, "Miss Johnson is an ideal hostess; she simply thought of everything and everybody." Of course the men just smiled, for they knew she was "her father's daughter."

A banquet in the La Salle was tendered to the members of the Institute. After the banquet an address by Dean Sumner on "Some Social Conditions and Problems in Chicago" was a treat but seldom enjoyed, and stamped the speaker as one of the "powers" of the great city. As Dean Sumner was a member of the "vice" commission which investigated the social conditions of Chicago, his opportunities for "knowing" were unparalleled.

Following this was an informal stereopticon lecture illustrating the possibilities of direct-color photography, by Mr. Harry Wells, Chicago. To those not acquainted with work of this nature, the results obtained were a great surprise and delight.

A pleasing feature of the banquet was the presence of Governor Dineen of Illinois and Sir Mackenzie Bowell, ex-Premier of Canada. Sir Mackenzie was the guest of honor that evening at another banquet in the same hotel, given by the Belleville Canadian American Society. When it became known that the distinguished Canadian was present, nothing would do but that he should come with Governor Dineen, who was also with the Canadian Americans. The grand old man, eighty-eight years of age, very graciously acceded to the request, and charmed our American cousins by his sprightly address and gracious manner.

Perhaps the paper or address that called forth the greatest amount of discussion was on "The Teaching of Dental Histology," by Dr. F. B. Noyes of Chicago. Those who know Dr. Noyes are fully cognizant of the fact that "thoroughness" characterizes everything he does, and a lack of this trait in others is possibly hard to overlook by the men who master everything they touch. Perhaps the one mistake he made was his comparison of dentists with the men of other professions. It was simply a statement that could not be verified and certainly was not borne out or corroborated by the experience of many men who were present, men who were much older, though perhaps less wise, than Dr. Noyes.

Dr. G. V. Black's paper (Tuesday evening) on "Recent Studies of Deposits of Calculus and Their Prevention" was just what you would expect it to be. Dr. Black read his paper, showed his lantern slides, and explained his method of procedure in pursuing his in-

vestigations. Very modestly, briefly, but none the less forcibly, he said: "These are the things I did, these are the results I obtained. I have not yet been able to draw definite, fixed, unalterable conclusions, but I hope to go on." Each century produces but a few great men. The nineteenth century produced Dr. Green Vardiman Black. May he long be spared, in the beauty, simplicity and splendid magnificence of his character.

On Thursday we visited the three schools of Chicago, the Northwestern University Dental School, the Chicago College of Dental Surgery, and the College of Dentistry, University of Illinois. The arrangements for visiting these three schools and seeing the work of each was the most perfect piece of committee work that the writer has ever seen. We take off our hats, one and all, to the local committee of arrangements, Drs. Arthur D. Black, Hart J. Goslee and G. Walter Dittmar.

THE ELIMINATION OF CREDIT.

MALCOLM W. SPARROW, L.D.S., D.D.S., TORONTO.

We are living in the very best times that have ever blessed our country. Never before have there been such opportunities. Prosperity prevails throughout the land, money circulates freely, employment awaits those who seek it, and poverty frowns upon those only who court it. In the Province of Ontario there are over two millions and a half of people, and to take care of the masticating organs of this industrious population there are but nine hundred and fifty dentists. Hence, it follows as a natural sequence that the only thing likely to cause a depression in what may be termed dental finance is an over indulgence of lax business methods.

There is plenty of opportunity to practice, and at the present period there is no reason why every practitioner should not have a substantial bank account. But the failure to collect large outstanding fees have made it otherwise. Only here and there will we find a dentist sufficiently methodical to secure all that he earns:

One of the most detrimental features of dentistry to-day is the credit system. Many a worthy practitioner has wasted his time, his skill, and his energy, and kept his family in circumstances that were almost menial, because of his failure to collect the fees that were due him. If a merchant allowed himself to be imposed upon in this way, he would assign in a few months. The reason the average dentist keeps at it, under the most adverse circumstances, is because his business methods are so bad that he never knows when he has failed. He gives long standing credits, and worries over the prospect of making ends meet. He listens to the tantalizing descriptions of the pleasure trips of his well-to-do patients, with the knowledge rankling that if their dental bills had been settled, he too might

have enjoyed a recuperative outing. Too often he realizes that he has been foolishly lenient, insufficiently exacting, and sentimentally inert over finance, if not rashly ignorant of the true meaning of dental ethics.

But he is not altogether to blame. The financial success of dentistry has been marred by the false ethicism that pervades the minds of certain practitioners, who, having set themselves up as censors, delude the new graduates into the belief that anything pertaining to business must be regarded as undignified and unworthy. It is a case of the presumptuous few dominating the credulant many. Only recently the following significant sentence appeared in one of our journals: "The subject of 'Business in Practice' is indeed a dangerous one to handle before a body of ethical practitioners." Evidently the spirit of musty mysticism still casts a shadow in this enlightened century, and common sense must be expounded with caution. If we are to be so very ethical, let us be normal rather than eccentric. The true ethician will not allow himself to be cheated into the belief that strict business methods are not sufficiently ethical to be assigned a conspicuous place in our code, without justifying the charlatanism of the advertising quack. Respectability is as ethical as anything else, but it requires a constant income to maintain the unmistakable appearances.

From the *Century Dictionary* we learn that "Ethics is the science of right conduct and character, the science which treats of the nature and grounds of moral obligation, and of rules which ought to determine conduct in accordance with this obligation, the doctrine of man's duty in respect to himself and the rights of others."

Now there is nothing in this definition to prove the business side of dentistry unethical, while there is a great deal in it which demands the closest attention to the collection of hard earned money. And there is this about money, it represents the energy, the skill, the worry and the exhaustion of him who earns it. In other words, it stands for the expenditure of that integral part of one's self proportionate to the compensation due. Up to a certain limit it commands respect, beyond this limit it evokes contumely and scorn. Only the rapacious seek unlimited wealth, and they are not yet sufficiently powerful to preclude industrious humanity from the avenues of comfort. Fortunately, in our land, they are in the small minority. But the carelessness of the present majority may some day so reverse matters that progressive individualism will be dominated by an arrogant plutocracy. Then there will be stagnation and poverty. In our political economy money is absolutely essential. The man who cannot earn it is no better than the pauper; he must needs subsist upon the bounty of others. The getting of money is a business, and "business is a word so large in its primary meanings that it covers the whole range of man's efforts. The same principles of thrift, energy, concentration and brains win success in any branch of business from medicine to dry goods."

Professional men are sought after for the knowledge that the commoners do not possess. The physician, the surgeon and the dentist are unquestionably necessary to the welfare of mankind, and yet they are the last to be considered when the spirit of remuneration moves the people. A partial cause for this can be traced to him who permits his professional enthusiasm to obliterate his sense of business. The two must go hand in hand, or the practitioner is a lop-sided failure.

Another element in this objectionable feature of credit is the injustice of one practitioner towards another. Dr. A. gives credit because Dr. B. does, and the two hurt each other continually. Dr. A. wants to do a cash practice, but his fear of Dr. B. prevents him. When he tells a patient that his terms are strictly cash, he is met with the statement that Dr. B. gives credit, and consequently he loses a prospective patient. Dr. B. is known to be "hard up" from one year's end to the other, in spite of his large patronage, and his imbecile carelessness over collections has not only made him the laughing-stock of the town, but has rendered it most difficult for his confrere to conduct a practice on business principles. The proper understanding and following of ethics would prevent this aggravating state of affairs, and would eliminate the sting of ridicule under which so many smart.

The supply houses have also added an element to this detrimental feature of credit. They have been too easy going. Dentists have been induced to take goods on unlimited time, and, until very recently, no effort has been made to arouse the over indulged patron from his apathy. If the supply house proprietors would insist upon prompt settlements, at certain periods, the dentist would know that he must "wake up," or become an undesirable customer. But here again competition has obscured the principles of ethics, and the practitioner has been allowed to drift along almost to his undoing. Terms strictly cash, to all, for all, and by all, would make our profession sufficiently lucrative to avoid exorbitant fees, and fees are only exorbitant when a high remuneration is demanded for dentistry that is not up to an equally high standard.

It is a mistake to let patients believe that a dentist does not need money. He is not a capitalist, and his expenses are heavy. If he gives much credit, in order that he may meet his financial obligations, he must needs depend largely upon collections for his revenue. The early settlement of an account relieves him of much worry, keeps him in a better condition to serve his clientel to the best of his ability, and enables him to plan more accurately for the future. Thirty days' credit is all that can be reasonably expected. After thirty days an account is over due, and interest thereon can be legally charged. Frequently the collection of outstanding fees is a case of self-preservation, and a number of settled accounts, even of small dimension, has helped greatly to sustain one's reputation for integrity.

An ever prevalent knowledge of our usefulness to humanity, of our earnest endeavors to improve our technic, that we may be of greater service to the suffering, and of the great demands made upon our time, skill and energy, should be sufficiently encouraging for us to exact full and prompt settlements for services rendered. It is not so much that we should advance our fees, as that we should be stricter in collecting them.

We have climbed the hills of professional technic until we are tired. Let us sit down for a moment to contemplate the beautiful perspective of professional prosperity. The elimination of credit is a turn in the right direction. The men who have already reached the heights of pecuniary success, should, for the sake of the profession, encourage those who are still at the foot hills. The sooner we adopt this principle as a body, the sooner will our financial troubles be at an end.

THE TECHNIC AND TREATMENT OF PULP CAVITIES.

LEUMAN M. WAUGH, D.D.S., BUFFALO.

Read before the Institute of Dental Pedagogies, Washington, D. C., Dec. 27, 28, 29, 1911.

Acting upon the request of your Executive Board, that the methods of teaching this subject, in vogue in the different colleges, be ascertained and a paper prepared, the following list of questions was sent to all of the colleges:

1. Do you teach the universal application of the rubber dam in pulp cavity treatments?
2. In opening into a pulp chamber, where no opening exists, what instruments do you use?
3. Do you give students any rule for opening between the cavity and canal; as "walls of the cavity and the pulp chamber should be continuous"?
4. What instruments do you use for removing a pulp that is not disorganized? (Contents of the pulp cavity not infected.)
5. What instruments do you use for exploring a canal where life is extinct? (Contents not infected.)
6. What instruments do you use for exploring a canal where the pulp is dead? (In a condition of decomposition, therefore infected.)
7. What instruments do you use for cleansing and enlarging pulp canals?
8. What instruments do you use for washing and drying canals, applying medicaments, etc.?
9. What medicaments do you employ in the first treatment?
 - (a) When the pulp was removed under pressure analgesia?

- (b) What in the second treatment? (Technic of filling not wanted.)
10. What medicaments do you employ in the first treatment:
- (a) When arsenic was applied?
 - (b) What in the second treatment?
 - (c) If a third is given, what is used?
11. When the pulp was dead and in a state of decomposition, and the periapical tissue not diseased, what medicaments do you use:
- (a) In the first treatment?
 - (b) In the second treatment?
 - (c) In subsequent treatments?
12. When the pulp was dead and in a state of decomposition, and there is inflammation about the apex, or abscess without sinus, what medicaments do you use:
- (a) In the first treatment?
 - (b) In the second treatment?
 - (c) In subsequent treatments?
13. When the pulp was dead and in a state of decomposition, and there is chronic abscess discharging on the gum, what medicaments do you use:
- (a) In the first treatment?
 - (b) In the second treatment?
 - (c) In subsequent treatments?
14. What materials do you use for sealing medicaments in treatment of the pulp cavity?

These questions were accompanied by a further request that extracted teeth be opened to show proper approach to the root canals of sound teeth, as follows:

One upper incisor, 1 lower incisor, 1 upper bicuspid, 1 lower bicuspid, 1 upper molar, 1 lower molar.

The teeth would best be soaked for a few hours in a solution of glycerine $\frac{1}{4}$ and water $\frac{3}{4}$ to soften the canal contents.

These are then to be opened to show the proper approach to the pulp chamber and root canals—filled teeth will be regarded as sound. These will be mounted and exhibited for discussion, and become the property of the Institute.

To this latter request there were only nine who responded, even though a personal letter was sent to many of those who returned only answered question lists. The teeth are on exhibit. Thirty-eight colleges were heard from, the questions being answered by thirty-three.

In the preparation of an outline which must cover so broad a field, it becomes necessary to deal as much as may be with the *bare basic principles*. It will be assumed that the student is given thorough instruction in the anatomy, histology and physiology of the structures composing the teeth and jaws, and that from this basis

he is taught to comprehend morbid changes, and develop a good pathologic reasoning power. And further, that he will understand the therapeutic effect of the agents selected for the treatment.

The student, then, having a thorough knowledge of dental anatomy and the modifications in the form of the pulp cavity, due to the deposit of secondary dentin—other deposits of calcific matter will not here be dealt with—should, in his operative technic course, be taught to properly open the pulp cavity in sound teeth of the different classes. This will serve to inculcate the principles. He will readily understand that in opening through a cavity of decay, that the same approach will be necessary, and that if it is not included in the orifice of the cavity of decay, that the outline form must be extended to practically include the area as opened when the tooth is sound.

All teachers will, of course, not agree on the same method and sequence of presenting this work. From an interpretation of the answered questions, the following outline would seem to form a logical basis.

Proper opening of the pulp cavity to permit thorough *mechanical* cleansing is the basis of success in root canal work. Therefore, the rules and technic of opening the pulp cavities of teeth will first be outlined.

The general rule is: Cut to weaken the tooth as little as possible, yet reach the chamber at a convenient point; then follow the specific rule: "The walls of the cavity should be continuous with the walls of the pulp chamber, but not necessarily parallel with or on the same plane."—D. M. Cattell and Thomas E. Weeks.

OPENING THE PULP CAVITIES OF TEETH.

In *Incisors and Cuspids* the best place for entrance to the pulp chamber is through the central portion of the lingual surface. This will hold true when approximal surfaces contain good fillings. When such a filling is defective it should be removed and the pulp chamber entered through the cavity.

PROGRESSIVE TECHNIC IN OPENING THE PULP CAVITIES OF INCISORS AND CUSPIDS WHEN SOUND.

(a) Perforate the enamel with a bibevelled dentate fissure bur of 1 m.m.

(b) Enlarge the opening with a larger bibevelled dentate fissure bur.

(c) Perforate the dentin with the 1 m.m. and larger bibevelled dentate fissure burs. With a small size cut a shallow pit into the dentin; then increase its diameter with one of larger size. Alternate in this way until the pulp chamber is reached. Avoid binding, heating and danger of breakage by frequently withdrawing the burs.

(d) Straighten the approach by first opening to the incisal

extremity of the pulp chamber with a smoothed end dentate fissure bur—the end made smooth and slightly convex with a stone; then with a tapered canal reamer, Kerr type, used preferably by hand, but in the engine when deemed best.

The canal is now ready to be cleaned. The procedure will be outlined later.

WHEN THE OPENING IS MADE THROUGH A CAVITY OF DECAY IN INCISORS OR CUSPIDS, THE TECHNIC WILL BE:

(a) Cut to a sufficient outline form to firmly retain a temporary filling. The final outline form and permanent anchorage will be made later.

(b) Excavate the walls until they are clean. All decay must be removed and the cavity made aseptic before uncovering the pulp. Remove softened dentin on the pupal wall with spoon or discoid excavators, the latter often being better in anterior teeth.

(c) Should this expose the pulp, a small hoe may be passed into the opening, and much or all of the remaining covering of dentin lifted off. If there is a considerable thickness of solid dentin, penetrate with bibevelled dentate fissure burs.

(d) Straighten the approach. A lingual extension in outline form will be necessary.

The canals are now ready for cleaning.

In *Bicuspid*s and *Molars* the best approach to the pulp chamber is from the occlusal surface, in bicuspid's through the mesial pit; in molars through the pit in the central fossa.

Teeth containing good fillings should be opened as when the tooth structure is sound, penetrating filling or enamel as the case may require. When there is a defective approximal filling it should be removed and the pulp chamber entered through the cavity. This will not always hold good with disto-occlusal defects.

Should a defective filling or a cavity of decay exist from which good access to the pulp chamber is impracticable, a filling should be made and the tooth opened as when sound.

PROGRESSIVE TECHNIC IN OPENING THE PULP CAVITIES OF BICUSPID'S AND MOLARS WHEN SOUND.

(a) Perforate the enamel with bibevelled dentate fissure bur of 1 m.m.

(b) Undercut the enamel with inverted cone bur, and cleave it away with chisels. In molars the opening is usually enlarged to the mesio-buccal of the central fossa, to afford the best position from which the bur can be directed a little to the mesial of the central part of the chamber.

(c) Perforate the dentin with small—1 m.m.—and large bibevelled dentate fissure burs.

(d) The entire roof of the pulp chamber should be removed and cavity formed after the specific rule: "The walls of the cavity

and pulp chamber should be continuous and smooth." Use a smooth and dentate fissure bur, exercising care not to cut the fissure walls, and especially not the floor of the chamber. For extension to the mesio-buccal horn in upper molars a cleoid used by hand is often best.

(c) The orifices of the canals are now found with a small, smooth, round broach, and if they are not naturally so, the orifices should be made continuous with the walls of the pulp chamber, with a tapered canal reamer.

(f) Always clear the field of all cuttings which might get into and clog small canals.

The canals are now ready for cleaning.

WHEN THE OPENING IS MADE THROUGH A CAVITY OF DECAY IN
BICUSPIDS AND MOLARS THE TECHNIC WILL BE:

(a) Provide firm retention for a temporary filling.

(b) Remove all decay and make the cavity aseptic before uncovering the pulp. Remove the softened dentin on the pulpal wall with spoon excavators.

(c) Should this expose the pulp, a hoe may be passed into the opening and much or all of the roof lifted off. If there is a considerable thickness of solid dentin, penetrate with bevelled dentate fissure burs.

(d) Make the walls of the cavity and pulp chamber continuous.

(e) Make the walls of the pulp chamber and canals continuous.

(f) Clear the field of all cuttings.

The canals are now ready for cleaning.

OPENING CONSTRICTED PULP CHAMBERS AND ROOT CANAL.

In cases when the pulp chamber is much constricted, the orifices of the canals should be located *before* cutting the walls of the pulp chamber. After the mouths of the canals have been found, the walls of the cavity and pulp chamber should be made continuous. The orifices of constricted canals should now be opened with a tapered canal reamer. A small spiral broach reamer should next be passed into the canal as far as possible with a careful boring movement, and withdrawn in a direction that will tend to straighten the canal. This should be repeated, using reamers of gradually increasing size, until the canals are well opened. In obstinate cases phenolsulphonic acid* should be used to soften, and the walls then well broached with a spiral broach reamer. Subsequently neutral-

*(Sulphuric acid and phenol a.m., or after Dr. Buckley's formula.)

ize with sodium bicarbonate, saturated solution. The canal should now be washed with sterile water, carried with cotton on a small square broach, to remove the excess of sodium bicarbonate. then wiped with cotton, and dried with alcohol and warm air.

The pulp cavity is now ready for further procedure.

REMOVAL OF THE CONTENTS AND CLEANING OF THE PULP CAVITY.

This part of the work must be finally taught in the clinic. The student should, however, have been well drilled in the symptoms and diagnosis of the different conditions, together with the medications indicated and the method of application of each. Should this collective instruction be given by more than one chair the several heads should be regularly in attendance in the infirmary. The demonstrating staff, to be in accord and give relatively uniform instruction, must be reminded by occasional review talks by the chair.

The contents of the canals must not be disturbed until the field is cleared of all cuttings. Should further cutting become necessary after one or more of the canals are cleaned, these should be lightly plugged with cotton to prevent the entrance of newly made cuttings.

PULP CAVITIES WILL PRESENT FOR CLEANING IN THE FOLLOWING CONDITIONS:

(a) With the pulp tissue insensible, but not disorganized—anesthetized with cocaine or destroyed with arsenic.

(b) With the pulp tissue disorganized and in a state of decomposition, therefore infected, and the periapical tissue *not* diseased.

(c) Containing pus discharging from a periapical abscess without sinus.

(d) In a state of periapical abscess with sinus.

(a) When the pulp is *not disorganized*, under “aseptic precautions,” the tissue in the chamber, if any remain, should now be removed and exploration of the root canals made with a *small* smooth round broach. Next, a barbed canal cleanser, Donaldson type, of relatively small size, after having been tested by bending, and dipped in oil of cloves, is passed along a side of the canal to the apex or until it is felt to just bind, then withdrawn slightly until felt to be free. It is now rotated a little, with a back and forth movement, to make sure that it is moving throughout its full length. When one turn has been made it should be withdrawn. The entire contents will often come out the first time; if not, repeat. When the tissue breaks up into shreds, a small spiral broach reamer, dipped into oil of cloves, should be repeatedly passed to the apical end of the canal and withdrawn in rotation. Then wipe out remaining filaments with a few fibres of cotton wound tightly on a smooth square broach and moistened with oil of cloves and used in the same manner. Free the canal of blood, when present, with sterile water and alcohol.

At the second treatment, under “aseptic precautions,” the dressing should be removed and pulp cavity filled, unless there is severe irritation of the periapical tissue, in which case a dressing of phenol compound is placed in the canal and sealed. A counter-irritant should be applied to the gum.

A third treatment is rarely necessary if proper precautions are taken in removal of the pulp.

To prevent discoloration, Dr. Black tells us that it is absolutely necessary to prevent the admission of saliva or other decomposable material to the dentin after the pulp is destroyed.

(b) When the pulp tissue is disorganized and infected, but the periapical tissue not diseased, under "aseptic precautions," open the pulp chamber as outlined and seal a moistened dressing of formocresol with base-plate gutta-percha. Allow this to remain for from 24 to 72 hours.

If there is inflammation in the periapical area, with marked soreness of the tooth, the above procedure will be modified as follows:

Full excavation may be too painful, but the orifices of the canals should be located. Dress with formocresol. Apply a counter-irritant, prescribe local refrigeration, a cathartic, hot pediluvium, and such other general treatment for inflammation as may be indicated. This not causing the symptoms to subside, suppuration should be induced or an artificial sinus made. Should this become necessary, treat as in condition (c) or (d) as the case may be.

At the second treatment the canals may be cleansed. Take "aseptic precautions," and with spiral broach reamers, explore and ream the canals. Avoid forming a piston. Phenolsulphonic acid will be a helpful adjunct when indicated.

Dry the canals with alcohol and warm air and place a moistened dressing of formocresol in each canal and seal with base-plate gutta-percha for from 24 to 72 hours.

At the third treatment the pulp cavity should be ready to receive a filling.

(c) When the pulp cavity contains pus discharging from an abscess without sinus, under "aseptic precautions," open the pulp cavity, explore the canal, and *mechanically* evacuate the abscess; dress the *chamber* with formocresol and seal with base-plate gutta-percha for from 24 to 48 hours.

Should lack of time prevent evacuation of the pus, the dressing cannot be hermetically sealed at this treatment.

At the second treatment, open under "aseptic precautions," and if there is no visible pus, the canal having been reamed, a moistened dressing of formocresol is sealed into each canal with base-plate gutta-percha, and allowed to remain for about one week. Repeat, and if the case does not yield to a fourth treatment, it will usually be necessary to make an artificial sinus, and the treatment continued as outlined under stage (d).

(d) When there is periapical abscess, with sinus, the tract is probed and the channel, if small, is enlarged with a bistoury. "Aseptic precautions" are taken and the pulp cavity opened to the

apical extremity of each canal. Normal saline solution is washed through the root and sinus. Phenol-compound is now pumped through the tract until the mouth of the sinus is cauterized. In probing, if the carious bone was detected, phenolsulphonic acid should be used to cauterize the sinus. This is done by placing a pellet of cotton wet with the medicament into the pulp chamber and pressure produced with a piece of unvulcanized rubber—as in pressure analgesia.

If phenolsulphonic acid is used it should be neutralized with sodium bicarbonate, and the canal dried with alcohol and warm air.

Phenol compound is then sealed in each canal and allowed to remain for two weeks.

One such treatment will generally be sufficient for a cure.

If a second treatment is not effective, surgical means should be resorted to.

ESTABLISHING AND MAINTAINING AN ASEPTIC FIELD IN PULP CAVITY TREATMENT.

An aseptic field is the first essential to successful pulp cavity treatment. In no part of dentistry is the near approach to surgical cleanliness so necessary. The pulp cavity should in no case be hermetically sealed until the pulp chamber has been cleaned under "aseptic precautions." At all subsequent treatments the strictest asepsis should be observed. So almost invariably will the application of the rubber dam be necessary for this, especially with the student, that its universal application should be taught as a principle. After the dam is in place, the included teeth, before they are opened, should be scrubbed with a 1 in 500 solution of mercury bichlorid, carried in a pellet of cotton, and the teeth dried with alcohol. When the pulp chamber is to be entered through a cavity of decay the walls should be excavated and made aseptic.

No instrument used in opening a cavity of decay should be used in a pulp cavity in which the tissue is aseptic.

No instrument used in opening through a cavity of decay should be used in an infected pulp chamber until it is freed from debris and dipped in an antiseptic, as oil of cloves, or, still better, is sterilized.

All canal cleaners should be dipped in an antiseptic just before being used, whether they be new or were previously used, sterilized and laid away.

The tip of the thumb and forefinger should have an antiseptic, as oil of cloves, rubbed into the cuticle before being used for winding dressing for root canals.

All wipings of canal cleaners should be made on a sterile piece of gauze or napkin.

In cleaning more than one canal at a treatment, no instrument should be passed from an infected into an aseptic canal.

Saliva should not be allowed to enter a pulp cavity that has been made aseptic.

These precautions are collectively spoken of in the paper as "aseptic precautions"

For Sealing Treatments in Pulp Cavities, base-plate gutta-percha is best, provided it is properly placed. It should be warmed, shaped and the excess trimmed away, then removed and its inner surface moistened with oil of cajuput, then finally placed and cooled. Press to place gently to prevent forcing the medication through the apex. In this way it will adhere to the walls and tightly seal the cavity. If gutta-percha is improperly placed, oxyphosphate or oxychlorid of zinc would be better.

The outline as here given is of necessity very much condensed. That which is left unsaid would much more than double the length of this paper. The technic and treatment advocated voices in general the consensus of opinion as deduced from the answers given, together with the opinion of the writer, formed by the study of much text. Especially helpful was that of Dr. Black's *Operative Dentistry*, Volume II.

The attached appendix will show that there is great variance of opinion. It is sincerely hoped that this effort, together with the ensuing discussion, will result in a somewhat more uniform course in this branch

In conclusion, the writer wishes to express his full gratitude to all those who so kindly co-operated with him in answering the questions, and prepared the exhibit of teeth, and especially to Doctors Weeks and Cattell for unusual interest and assistance.

The specific rule mentioned was first given the writer by Dr. Thomas E. Weeks. Dr. D. M. Cattell taught it to his students about 1898. Neither will accept credit for priority, and as they frequently conferred with each other in years past, both were probably responsible in part. This is mentioned because the rule is so important that it should become an axiom in dentistry.

"The walls of the cavity and pulp chamber should be continuous and smooth."—Weeks.

"The walls of the cavity should be continuous with the walls of the pulp chambers, but not necessarily parallel with or on the same plane."—Cattell.

APPENDIX.

1. Do you teach the universal application of the rubber dam in pulp cavity treatment?

Yes, answered by twenty-four.

No, answered by four.

Modified answers, by five.

2. In opening into a pulp chamber, where no opening exists, what instruments do you use?

Drills only, advocated by nine.

Burs only, advocated by seven.

Both drills and burs, advocated by twelve.

Stones and burs, advocated by five.

Bibevelled drills, either plain or dentate, advocated by four; spear-pointed drills, by five.

Round burs advocated by fourteen:

Fissure burs, advocated by six.

Bud burs, advocated by one.

Inverted cone, advocated by one.

3. Do you give students any rule for opening between the cavity and the canal; as "walls of the cavity and the pulp chamber should be continuous"?
Yes, answered by twelve.
No, answered by seven.
Eleven refused to answer, some not understanding the meaning of the question.
4. What instrument do you use for removing a pulp that is not disorganized? (Contents of the pulp cavity not infected.)
Twenty-two use barbed cleaners.
Eight use spiral cleaners.
Two use hooked broaches.
One uses smooth broaches wound with cotton.
5. What instruments do you use for exploring a canal where life is extinct? (Contents not infected.)
Twenty-eight use fine round smooth broaches.
Two use spiral cleaners.
Two use hooked broaches.
6. What instrument do you use for exploring a canal where the pulp is dead? (In a condition of decomposition, therefore infected.)
Eight use fine spiral broach reamers.
Fourteen use fine round smooth broaches.
Eleven misunderstood the meaning of the question.
7. What instruments do you use for cleansing and enlarging pulp canals?
Fourteen use spiral broach reamers.
Seventeen use barbed canal reamers.
Two did not answer.
Tapered canal reamers, Kerr type, used by six.
Beutelrock drills used by four.
Gates-Glidden drills used by twelve.
8. What instruments do you use for washing and drying canals, applying medicaments, etc.?
Twelve advocate small, smooth, square Swiss broaches, annealed.
Seventeen advocate fine, smooth, round broaches.
Four advocate spiral broaches.
Nine mentioned squaring the ends of the broaches.

Four mentioned a film of wax to aid in holding cotton on broaches.

9. What medicaments do you employ in the first treatment:—
 - (a) When the pulp was removed under pressure analgesia?
 - Phenol Compound (Buckley), by five.
 - Phenol, by six.
 - Eugenol or Oil of Cloves, by four.
 - Black's 1-2-3 Compound, by two.
 - Modified Formocresol, by two.
 - Tricresol, by two.
 - Cresol, by one.
 - Hydrogen dioxid, by four.
 - Thymogen Compound (Cattell), by one.
 - Eucalyptol and Iodoform, by one.
 - Campho-phenique, by one.
 - Avoid medicaments, by two.
 - (b) What in the second treatment? (Technic of filling wanted.)
 - No treatment, place filling, by sixteen.
 - Phenol Compound, by one.
 - Phenol, by three.
 - Cresol, by one.
 - Eugenol or Oil of Cloves, by one.
 - Dentalone (Parke, Davis & Co.), by one.
 - No answer, by ten.
10. What medicaments do you employ in the first treatment:—
 - (a) When arsenic was applied?
 - Phenol Compound, used by five.
 - Phenol, used by seven.
 - Eugenol or Oil of Cloves, used by one.
 - Glyceride of tannin, used by two.
 - Modified Formocresol, used by seven.
 - Tricresol, used by two.
 - Cresol used by two.
 - Thymogen Compound, used by one.
 - Campho-phenique, used by one.
 - Any antiseptic, used by five.
 - (b) What in the second treatment?
 - Place filling, advocated by sixteen.
 - Same agents as in (a), advocated by twelve.
 - Arsenic replaced if sensitive, mentioned by five.
11. When the pulp was dead and in a state of decomposition, and the periapical tissue not diseased, what medicaments do you use:—(a) In first treatment?
 - Formocresol, used by nine.
 - Tricresol, used by twelve.
 - Cresol and Formalin, a.a., used by six.
 - Creosote, used by three.

Sodium dioxide, used by one.

Anti-pus (Cattell & Leroy), used by one.

No answer to this question, by one.

(b) In the second treatment?

Formocresol, used by seven.

Tricresol, used by eight.

Cresol and Formalin a.a., used by four.

Cresol, used by one.

Creosote, used by one.

Guaiacol, used by one.

Eugenol or Oil of Cloves, used by three.

Phenol Compound, used by three.

Eucalyptol, used by one.

Black's 1-2-3, used by one.

Anti-pus, used by one.

Thymo-camphene (Kennerly), used by one.

No second treatment, one.

(c) In subsequent treatments?

Formocresol, used by six.

Tricresol, used by five.

Cresol and Formalin, a.a., used by one.

Eugenol or Oil of Cloves, used by three.

Phenol Compound, used by two.

Thymol and Eucalyptol, used by one.

Thymo-camphene, used by one.

No answer, by fourteen.

12. When the pulp was dead and in a state of decomposition, and there is inflammation about the apex or abscess, without sinus, what medicaments do you use:—

(a) In the first treatment?

This question proved ambiguous, and was not answered by thirteen.

Pus not having formed, the treatment given is the same as for Question 11.

Pus being present, removal of all decay, and immediate exploration of the canals, with drainage of pus, was advocated by seven.

Formocresol or tricresol and formalin a.a., tightly sealed, advocated by nine.

Formocresol or tricresol, and formalin a.a., not tightly sealed, advocated by five.

Creosote, used by two.

Various other agents used by four.

(b) In the second treatment?

Practically the same as in (a).

13. When the pulp was dead and in a state of decomposition, and

there is a chronic abscess discharging on the gum, what medicaments do you use:—

(a) In the first treatment?

Sinus is opened and cleansed at first treatment by nineteen.

Sinus not cleansed at first treatment, by two.

This point not made clear, by twelve.

For irrigation of sinus:—

Normal saline solution used by five.

Peppermint water used by six.

Cinnamon water used by two.

Cassia water used by one.

Hydrogen dioxid used by four.

Permanganate of Potassium and Hydrogen dioxid, used by one.

For cauterizing the sinus:—

Phenol Compounds, used by three.

Phenol, used by five.

Creosote and Alcohol, used by one.

Aromatic Sulphuric Acid, used by one.

Phenolsulphonic acid, used by one.

Immediate surgical measures advocated by one.

For dressing the pulp cavity:—

Phenol Compound, is used by six.

Phenol, is used by eight.

Eugenol or Oil of Cloves, is used by three.

Black's 1-2-3, is used by two.

Thymo-camphene, is used by one.

Various formalin and creasol compounds are used by thirteen.

(b) In the second treatment?

Is the sinus is not closed it is cauterized with"—

Phenol-sulphonic acid, by seven.

Aromatic sulphuric, by five.

Zinc chlorid solutions, by two.

Thymo-camphene, used by one.

Phenol Compound or phenol, by four.

Bismuth paste (Beck), used by one.

Surgical measures advocated by five.

For dressing the pulp cavity:—

Practically the same as in part (a).

13. (c) In subsequent treatments:—

surgical measures, advocated by nine.

Phenolsulphonic acid, advocated by six.

Aromatic Sulphuric, advocated by four.

Phenol Compound or phenol, advocated by three.

Bismuth Paste (Beck), advocated by three.

Treatment not clearly outlined, by eight.

14. What treatments do you use for sealing medicaments in treatment of the pulp cavity?

Permanent or base-plate gutta-percha, in conjunction with Oil of Cajuput, used by four.

Permanent or base-plate gutta-percha, used by five.

Oxysulphate of zinc, used by eight.

Cements (kind not specified), used by eight.

Temporary cement, used by one.

Calxine, used by four.

Oxychloride of zinc, used by two.

Temporary stopping used by eleven.

Sandarac varnish and cotton used by four.

(Some gave more than one agent for sealing.)

For formulae of Dr. Buckley's agents, the reader is referred to his published works.

Thymoken Compound (Cattell).

Crystals of Phenol.

Crystals of Menthol.

Crystals of Thymol a.a.

Thymo-camphene (Kennerly).

Crystals of Phenol.

Crystals of Thymol a.a. 2 parts.

Camphor, 1 part.

Anti-pus (Cattell & Leroy).

Formalin.

Six other drugs (not specified), a.a.

Phenolsulphonic Acid.

Phenol.

Sulphuric Acid, C.P. a.a.

Or after Dr. Buckley's formula

Bismuth Paste (Beck).

Bismuth Subnitrite, 30 parts.

White Wax, 5 parts.

Paraffin, 5 parts.

Vaseline, 60 parts.

The vehicle of wax, paraffin and vaseline may be varied in its proportions so as to modify the consistency.

PYORRHOEA ALVEOLARIS.

W. T. MORROW, D.D.S., MAXVILLE, ONT.

Read before the Ottawa Dental Society, Jan. 4th, 1912.

In presenting this time-worn subject to-night I feel incapable of advancing any new ideas. But if by collecting and assorting past ideas or even by presenting the subject in such a manner as to stimulate a discussion that will bring out other ideas which will

serve to assist in mitigating the ravages of this destructive disease, I will feel well repaid for any time and efforts I have given to this paper.

To discuss this subject intelligently it is necessary to fix definitely in our minds the point of initial attack. And to do this it will be necessary to describe the relation of the tooth to the alveolus.

The tooth represents a fixed joint, known by the name of gomphosis.

The alveolus is lined with periosteum, which is reflected on the tooth at the point of the root as the pericementum to the neck of the tooth where it becomes continuous with the fibrous tissue of the gum.

It is on account of this tissue which lines the free margin of the gum, losing its function either through predisposing or exciting causes, local or general, that the disease gains access to the deeper tissues. If the lining of the gum under the free margin, whose function it is to keep the neck of the tooth clean is prevented from doing its work properly by any of the numerous causes that it is heir to, we will find deposits collect on the neck of the tooth, and this in turn forms an irritant which makes it still further lose its usefulness. It gradually becomes inflamed and everted to form a receptacle for further deposits, which in turn produces destructive inflammation of the peridental membrane and alveolus, accompanied by pus and further deposits.

It is not a specific germ disease, but many different germs are found which assist in carrying on the destruction. The character of the deposits depends largely upon the nature of the germs found in the pockets.

It is not a disease of the alveolus, since the gum heals completely when the tooth is removed.

The predisposing causes are defective metabolism, either through inherited tendencies, acquired diseases, or an overtaxed system.

These manifest themselves in the gum tissue by a decreased vitality of the free margin, which is a continuation of the peridental membrane. The peridental membrane loses its function, but is not attacked unless the portal is opened. The local exciting causes are: accumulations of tartar which impinge on the gum tissue, malocclusion, misfitting dentures, improper attachment of crowns and abutments for bridges, or orthodontia appliances.

The first treatment in all cases is to remove all deposits and improper appliances. Place the gum and surrounding tissues in a sanitary condition.

Where there is found to be defective metabolism refer the patient to a physician for treatment.

The removal of the deposits may be accomplished by skilled instrumentation, but I always use some solvent, as Dr. Head's preparation of bifluoride of ammonium, lactic acid, or aromatic sulphuric acid as an auxiliary.

When I am convinced that the accumulations are completely removed, I prescribe a disinfectant, astringent stimulating mouth wash as follows:

R

Hydronaphthol	1	3
Tinct. Krameria	11	3
Glycerine	11	3
Acquae Rosae	11	3

Sig.—A teaspoonful in a wine glass of water and wash the mouth four times a day, after meals and before retiring.

This has the effect of restoring the gum to its normal condition.

In many cases we find that the tooth has become sensitive to thermal changes, a condition which may be corrected very often by the application of a 40% solution of formaldehyde, or a 50% solution of nitrate of silver. The nitrate of silver is especially useful where the sensitiveness is the result of abrasion. The silver stain can easily be polished off.

These agencies are not always effective, especially when there is a chronic hyperæmiac condition of the pulp. In these cases devitalize and thus remove the internal irritant, which will give one more chance of saving the tooth, because the peridental membrane cannot become normal when the pulp is unhealthy.

In cases where the teeth have become loose they should be stayed, and be restored to usefulness if the loosening is only caused by an inflammatory thickening of the peridental membrane, but if the loosening is the result of its complete destruction, then extract to save the patient further trouble.

Our greatest field of usefulness in this disease is to educate the people to watch their gums as carefully as they watch their teeth for the appearance of a cavity.

In conclusion I will cite a case in my own practice of a girl about fourteen years of age, the daughter of a physician who came to me about ten years ago with her gums inflamed and the necks of many of the teeth covered with granular deposits. I removed the deposits and placed the mouth in a sanitary condition. But the deposits would collect again and have to be removed a couple of times a year. I advised the parents to have her visit a specialist, but they did not consider the case of sufficient importance to do so. I then procured Dr. Head's preparation and used the mouth wash I mention, and have kept the gums from receding. The peridental membrane has not been attacked, but if she discontinues the occasional use of the wash I still find a few teeth will become affected.

INVESTMENTS.

BY W. C. GOWAN.

Business men demand interest or dividends upon all capital invested in their business, after making allowances for wear and tear, depreciation, operating expenses and risk. If the capitalist devotes his own time to the business he gets a salary. Whether through the medium of watered stock or otherwise, a business is made to yield profit over and above the foregoing for the benefit of its promoters and influential shareholders.

The dentist is capitalist, director, manager engineer and workman in one. He assumes all responsibility and risk. If an insurance company carry the latter for him he pays for it. Fees for his professional services should include allowance for all the items in the cost of that service.

The items generally underestimated or overlooked by the dentist in adjustment of fees to cost of service are, the amount of service, capital invested and the risk of the investment.

A dental student upon matriculation, at the age of twenty-one or more years, is, or ought to be, worth \$600 per year. His college course will cost him in cash about \$600 per year. So his investment (time and cash) for four years will be approximately \$4,800.

To begin practice, material equipment will cost about \$1,500. To finance his expenses until he can pay them by fees collected a variable amount of capital (elsewhere considered) must be invested. However, the L.D.S. and material outfit have now cost \$6,300.

What rate of interest should he get on this investment? On land mortgages or other good security interest is $5\frac{1}{2}$ per cent. If the young graduate should suffer injury to eyesight or hands or any disability to practice, *e.g.*, death, during this first year of practice, what amount of his capital could he recover or bequeath to his heirs? Certainly none of the \$4,800, very little of the \$1,500, and less still of whatever capital he had expended in the effort to secure practice. Capital thus invested, without material security and perishable at death or inability to practice, must bring at least interest on the money and cost of life insurance for the sum invested. This will be not less than 10 per cent. per annum.

As a business proposition it is clear that from the beginning of practice a dentist should calculate to get the current expenses of practice, a salary for himself and 10 per cent. on capital invested (\$630). But experience shows that men, however justly entitled to this amount of income in the early years of dental practice, seldom if ever get it. The fact is that a paying dental practice depends upon the education, confidence and good will of the clientele, and is established only by years of patient and studious industry and exercise of skill on the part of the dentist.

Let us suppose ten years to be spent in the development of a

paying practice and the skill and experience to conduct it—not an extravagant estimate, as many tolerably energetic men know, to their cost. A salary of \$2,500 per annum will not be disputed as overpayment for the dentist throughout this period. Then for ten years he should get, clear of current expenses, \$2,500 salary + \$630 (on investment) yearly, or \$31,300 for his own use during this period.

Now, to compute with due regard for probability, let us suppose the dentist gets altogether \$10,000 for his own use during the first ten years, what becomes of the difference, \$21,300 due, but as yet unpaid? Such sum, whatever its amount, is surely *capital invested*. So are sums of money spent on behalf of his further education, expenses of attending conventions, contributions, dues, literature, dental society work. Ten thousand dollars spent thus in ten years would not be without precedent. Interest (on capital invested in the early years of practice-building) not paid or accounted until the ten of the ten-year period would probably exceed \$1,500.

If values, expenditures and receipts are about as above supposed, a dentist past the age of thirty-five finds all the earnings and savings of the more energetic half of a lifetime represented by \$6,300 + \$21,300 + \$1,000 + \$1,500, or approximately \$30,000 capital, invested without tangible security. This capital is perishable upon inability to practice. It is not transferable and is recoverable only by subsequent years of severe labor on the part of the investor.

At 10 per cent. per annum the invested capital, principal and interest together would be recoverable in fifteen years. To get on account of investment \$3,000 per year of 250 working days \$12 in addition to allowance for salary and current expenses must be collected each day. If expenses and salary amount to \$15 a day, then \$27 a day must be collected. If *profit is expected*, then more than \$27 must be collected daily.

Dominion Dental Journal

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EVOLUTION AND REVENUE.

That man whose situation is worse than it was is to be pitied if he can see no compensating advantage as an outcome of present reverses or seeing decline of fortune. Things are not always what they seem. That which seems good may have in it the seeds of evil, and things seemingly evil may have a soul of goodness in them.

During the past two decades the majority of dentists in Ontario have viewed with regret, if not with alarm, a steady decline in 'prices' (to use their own expression) of sets of artificial teeth, fillings, crowns, bridgework and the like. Smaller remuneration could hardly be welcome to those practical men whose aim it seemingly was to provide such things and stimulate demand for them.

The ever-increasing cost of living and conducting a dental practice, together with concurrent decline in the "prices" of finished products, was, and is, very substantial cause for the regrets of those

who once enjoyed profitable trading in these things and neglected science as having *nothing practical* in it.

Those who practised fifteen years ago know that the average "price" of a set of artificial teeth was then about \$12. An equally good (or bad) article in the same line seldom now brings more than \$7, despite the increased cost of rubber. The "silver" filling then sold at 50 to 75 cents brings the same "price" still—the economic minimum. But "crown and bridgework" then at \$10 per tooth is now away down to \$5, and even \$4, because a mere mechanic can make the stuff that passed under this name, ready for the L.D.S. to put in or deliver, as it were.

There is no ground for belief that this economic evolution will cease or yield to any power available within the dental profession until the trade dentist is either evolved out of commercial into professional practice or reduced to that remuneration and status economically inevitable or, in other words, suited to his deserts. Competition among tradesmen, whether holders of L.D.S. or not, will thus result so surely as supply exceeds demand.

Now, is the decline of "prices" an evil? Results should be examined before an answer is given.

Men in a position to know will acknowledge that at the present time the practice of Dentistry is more prophylactic, conservative and humane than it ever was before, and held in correspondingly higher esteem by the public who enjoy the benefits. The studious, well-trained practitioner who measures up to professional requirements is better rewarded financially and otherwise than he ever was before. Fewer teeth are extracted and fewer of those submitted to the dentist are lost for want of skill on his part than was the case at any former time. Means to lessen or prevent the diseases by which teeth are lost are now the chief subject of scientific enquiry. And the results of enquiry in this province receive more attention than was customary heretofore. Men once engaged chiefly in extracting teeth and providing substitutes find their attention turned more and more to conservation.

As the "plate" or "set" became cheap men turned their attention to "crown and bridgework." As the latter in its turn becomes cheap and discredited attention is again shifted to conservation, and even prophylaxis, as a field for the profitable exercise of skill. In short, the time has come when the dentist finds himself compelled to learn to do that which is of most benefit to his patient

and credit to his profession, which a few years ago he did not have to do because there was profit to be had without that trouble.

If anyone object to the assumption that a considerable number of dentists have moved in the right direction only upon compulsion we refer him to the fact that things done in this life are done upon compulsion. And if he doubt the fact let him refuse to eat or drink or sleep to find in how short a time he will experience compulsion. It is not necessary here to consider the motives (other than economic) that impel the nobler sort of men to great achievements.

If a dentist could get a professional man's income for doing a tradesman's work one potent inducement to progress would be lacking. But when he finds, as many now do find, that he can get no more than tradesman's pay for tradesman's services he has a motive for progress that he did not have before. Men are sensitive to this kind of persuasion and likely to amend both theory and practice in consequence of it.

Judged by its results then, the decline in "prices" seems no evil—rather a blessing, however ugly its disguise, to those compelled to move on.

W. C. G.

Editorial Notes.

Dr. W. H. McGuirl, formerly of Cardinal, Ont., is now practising in Smith Falls.

The Saskatchewan Dental Examinations were held in Regina January 13-15, 1912.

Dr. Canby Hatheway, of Berwick, N. S., has begun practice in Halifax, N. S.

Dr. Wilkinson, Berlin, Ont., has begun practice in Regina.

Burglars entered the office of W. J. Wrigglesworth, New Westminster, B.C. A number of instruments were taken.

Dr. George A. Fraser, of Park Hill, has been a member of the Park Hill School Board for six years. Dr. Fraser was chairman of the Board last year and was re-elected this year.

A combined meeting of the Ontario and Canadian Dental Associations will be held at Hamilton, Ontario, on June 3, 4, 5 and 6, 1912.

Dr. M. H. Garvin, of Winnipeg, passed through Toronto on his way to the West

Indies, where he expects to spend a couple of months. While in Toronto he delivered an address on "Economics" to the Odontological Club.

Dr. R. M. Chambers has been a member of the Leamington School Board for two years, and this year was elected chairman.

Dr. F. W. Hamilton, Secretary Educational Committee, 318 Somerset Block, Winnipeg, Man., has lantern slides, charts and all other matter in connection with giving public lectures in Oral Hygiene. He will be very glad to loan them upon request.

Obituary

DR. ROBERT R. DALGLEISH.

On January 27, 1912, after an illness of only two days, Dr. Robert R. Dalgleish died of pneumonia. Dr. Dalgleish was 63 years of age, and has resided in Winnipeg since 1880. He studied his profession and graduated in New York. He was the first President of the Western Dental Association. The late Dr. Dalgleish is survived by his wife and one son.

Proceedings of Dental Societies

BOARD OF DIRECTORS, MANITOBA.

Elected at recent meeting—M. H. Garvin, J. M. Rogers and D. N. Ross. Officers of the Board—President, G. F. Bush; Secretary, D. N. Ross; Registrar, H. A. Croll; Treasurer, J. M. Rogers.

ALBERTA RE-ENTERS THE DOMINION DENTAL COUNCIL.

Owing to some slight defect in the Alberta dental law, the Dental Association thought it advisable to withdraw from the Council last June. Since then the defects in the dental law have been corrected, and the Province has again become one of the agreeing provinces of the Dominion Dental Council.

BRITISH COLUMBIA DENTAL EXAMS.

There were eighteen candidates wrote on the B. C. Dental Examinations. Only four were successful:—H. C. Banford, C. J. Smith, J. E. Black and R. A. Sipes, all of which are Ontario graduates.

OFFICERS OF THE PRINCE ALBERT DENTAL ASSOCIATION.

The dentists of Prince Albert, Alta., held a meeting on January 28th for the purpose of forming a Dental Association. The following officers were elected;

President—Dr. J. A. Moran.

Vice-President—Dr. R. C. Bain.

Secretary—Dr. W. S. Holmes.

HAMILTON DENTAL SOCIETY.

Reported by J. A. C. Hoggan,
D. D. S., L. D. S.

The December meeting of the Hamilton Dental Society, Monday 1st, at Waldorf Hotel, added one more to the now growing list of successful dinners.

Dr. Frank Lowe, of Buffalo, gathered about him the Society giving us an intimate and confidential talk on the preventive dentistry, lighting up those dormant dark and empty cells with prophylactic light. Together we worshiped at the shrine of Mechanical Cleanliness, leaving at the feet of the Gods of Mastication a few tablets of potassium cyanide.

Dr. Lowe is one of rather rare individuals who is anxious to talk on your own level rather than on that of the air space immediately above your head.

On February 12, Dr. Waugh, of Buffalo, will talk on Anatomical Articulation.

CANADIAN AND ONTARIO DENTAL ASSOCIATION.

Joint Convention, Hamilton, June 3, 4, 5, and 6, 1912.

Clinic Committee—E. Kelly, F. L. Williamson, O. S. Clappison, (Supervisor).

I will give a clinic as per answers below

Name.....

Address.....

Will you give a clinic.....

Subject.....

Will you give a table clinic.....

Subject.....

Do you want us to furnish patient? If so, state tooth and position of cavity you prefer.....

State anything you wish us to furnish.

Kindly fill in this card, even if you have already sent in the name of your clinic. We want to have the details correct for the program, and everything in readiness for the clinician. Send by return mail to O.S. Clappison, 44 Federal Life Building, Hamilton, Ont.

THE TEXAS DENTAL ASSOCIATION
MAY 2, 3, and 4, 1912.

The 32nd annual meeting of the Texas State Dental Association will be held at Abilene, Texas, May 2, 3, and 4, 1912. Exhibitors desiring space will please address Dr. C. M. McCauley, Abilene, Texas. The clinics will be in charge of Dr. J. O. Hall, Waco, Texas, who will furnish any information relative to same.

All ethical practitioners are cordially invited to attend the meeting, who will be cheerfully furnished any other information by the Secretary.

H. M. DAVISON, Pres.,
Hubbard, Texas.

J. G. FIFE, Secretary,
736 Wilson Bldg.,

Dallas, Texas.

CANADIAN DENTAL ASSOCIATION.
ONTARIO DENTAL SOCIETY.

Meeting at Hamilton, June 3, 4, 5 and 6, 1912.

Your presence at the C.D.A. and O.D.S. will be considered very much in the light of the man who pays as he goes: Mark off the dates on your appointment book now, June 3, 4, 5 and 6. There may be other Conventions. Who knows? The Hamilton meeting will not only be, but will BE great. As great as Dr. Hartzell, of Minneapolis, Dr. Logan and Dr. Goslee of Chicago, and a good Clinic list together with the largest Manufacturers' exhibit ever seen in Canada, can make it.

This Convention should be a complete relaxation from your work. A huge family party. The material conditions are there for comfort, ease, recreation and professional progress.

Hotel rates are moderate. \$2.00 per day, two in a room, \$2.50 with bath (American.) Reserve your room early. A. B. Coleman, Brant House.

Railway Associations are granting single fares on the certificate plan from any place in Canada.

J. A. C. HOGGAN,
Chairman.

A. V. LESTER,
Secretary.

KENTUCKY STATE DENTAL ASSO.

The meeting of the Kentucky State Dental Association will be held in Louisville, May 27, 28, 29, 1912. A special attraction of talented men from out of the State will

be on the program this year, and every indication points to the best State meeting that has been held for many years. The Dentists in Kentucky are especially invited, and a cordial invitation is extended to all ethical members of the profession.

FINANCIAL REPORT, CANADIAN ORAL PROPHYLACTIC ASSO.

RECEIPTS.

To Cash in Bank Jan. 1, 1911.....	\$579.60
One share stock.....	5.00
Fees, Associate Members (3)	3.00
Lyman Bros. & Co., for seals.....	691.20
John Hargreaves, for seals.....	318.12
Sale of Pamphlets.....	1.00
Contribution from Dental Society of Western Canada.....	50.00
Bank Interest.....	12.79

Total Receipts..... \$1660.71

ASSETS.

Registered Name "Hutax".....	\$25.00
Charter.....	10.00
Cuts, Dies, Slides, Charts, Type- writer, etc.....	70.00
Seals unused.....	40.00
Accounts receivable Lyman Bros. & Company.....	57.60
Accounts receivable, J. Hargreaves	42.00
Cash in Bank Dec. 31, 1911.....	729.35

Total Assets..... \$973.95

EXPENDITURES.

Educational Expenditures.

Dental Society Western Canada.....	\$ 77.00
Donation to Educational Committee of Dental Society of West. Canada	25.00
Donation to Educational Committee of the Ontario Dental Society.....	75.00
Donation to Hamilton Dental So....	24.45
Printing, engraving, designing, etc. for pamphlets and circulars	285.55
Oral Hygiene exhibit.....	285.55
Lantern Slides, Charts, Books, etc.	34.06
Allowance on brushes supplied to school children.....	35.36

\$589.86

Business Expenditures.

Salary Secy. Assistant.....	\$161.00
Solicitor's fees.....	10.70
Seals.....	57.50
Government Fee.....	2.00
Expenses of Annual Meeting.....	14.25
Typewriter.....	40.00
Guarantee Bond.....	2.00
Secretary's Expenses.....	54.05

\$341.50

Cash in Bank..... \$729.35

Total..... \$1660.71

LIABILITIES.

Capital Stock.....	\$140.00
Surplus.....	833.95

Total Liabilities..... \$973.95

A. J. BROUGHTON,
Secretary-Treasurer.

B. F. NICOLLS,

R. H. HENDERSON, Auditors

January 1st, 1912.

Reviews

THE AMERICAN TEXT BOOK OF OPERATIVE DENTISTRY. In contributions by Eminent Authorities, Edited by Edward C. Kirk, D.D.S., Sc.D., Professor of Dental Pathology, Therapeutics and Materia Medica, and Dean of the Dental Department of the University of Pennsylvania, Philadelphia; Editor of "The Dental Cosmos," Officer of de l'Académie de France. Fourth Edition, Revised and enlarged, illustrated with 1,015 Engravings. Kea & Fibiger, Philadelphia and New York, 1911.

This noted work has been for many years a standard in dental book preparation. The name of the Editor in Chief is sufficient to guarantee the highest standard. In the present edition many valuable sections are added. Among these are "Preparation of Cavities for filling" by Thomas Weeks; "Plastics," by Marcus L. Ward; "Gold Inlays," by W. A. Capon. In this section one is rather surprised to note this statement "One writer has given several pages of meaningless statistics about investments," while in a few lines later he says "The temperature for scientific casting should never be higher than just enough to burn out the wax." How does he know if some tests of investments had not been made? There are many methods of casting not mentioned, while one method is fully discussed as a basis. There is a great improvement over anything before published in the section relating to Pyorrhoëa and allied subjects. Any library could hardly be considered up-to-date without a copy.

EDUCATIONAL LECTURES ON DENTAL AND ORAL HYGIENE, edited by Dr. S. C. Trigger, Licentiate of the Royal College of Dental Surgeons of Ontario, Canada. Illustrated. St. Tomas, Ontario.

This is a book of sixty-five pages addressed to the public. It is not intended as a book for dentists, but undoubtedly would be very serviceable to those of the profession who are engaged in dental educational

work. It is made up of twelve sections, viz.: Introduction, the teeth, the temporary teeth, the permanent teeth, mastication, decay of the teeth, deposits on the teeth and diseases of the teeth, how to keep the teeth clean and healthy, cleansing the teeth and mouth, the normal and abnormal expressions of the face, artificial restorations of the features.

It is gratifying to have at least one Canadian dentist who is willing to put his ideas into permanent form. The author has previously published a work on making of inlays, which no doubt has found a place in many Canadian dental libraries. The present little book is a compilation of a number of facts about the teeth into readable form for the public. The illustrations are good. The paper and printing are suitable, the matter is readable and instructive.

As nearly always occurs with the first editions there are a few minor errors which will doubtless be corrected in later editions. The tooth brush illustrated in the tooth brush case is not the same as the one used to illustrate the brushing. The tooth brush case has under it these words "tooth case."

The Editor is not to blame for giving the lecture of Dr. Dowd in Toronto as having been delivered before the Ontario Dental Society, when it was in reality given before the Toronto Dental Society because the Ontario Dental Society claimed the work of the Toronto Dental Society. It might better have been published by the courtesy of the Toronto Dental Society than the author, because it was the Society's lecture to do as it pleased with once it was delivered. There is a half-tone illustration of the inspection of School Children in Toronto which is credited to G. P. Bryce, which was made for and first published by the Dominion Dental Journal, and should have been credited to it. Such little inaccuracies do not detract from the general value of the work. The editor will have the good-will and support of the Canadian profession if he wishes to press the claims of this work before the public.

Dominion Dental Journal

VOL. XXIV

TORONTO, MARCH 15, 1912.

No. 3

Original Communications

PARTIAL DENTURES.

W. E. CUMMER, D.D.S., L.D.S., TORONTO, ONT.

Read before the Toronto Dental Society, February 12, 1912.

Artificial restorations following the loss of teeth divide themselves naturally into three classes, viz.: those resting on the roots of teeth, as crowns and bridges, fixed and removable; those resting on the mucous membrane of the mouth, such as plate dentures, ordinarily called, and then a class resting on the natural roots as well as the mucous membrane, sometimes called removable bridges, sometimes combination dentures; a class of restoration, the possibilities of which, in the mind of the writer, are just opening up to the profession, by reason of their increased stability, increased resistance to the stress of mastication, as well as esthetic possibilities, and minimum necessity of altering or cutting natural remaining teeth.

In many respects the crown and bridge form of restoration seems to more closely approach the ideal. They possess greater rigidity and afford the most resistance to the force of mastication, and may be frequently used as a tie or splint, in which the support of more healthy natural organs may be afforded to the weaker. They occupy practically the same space as their natural predecessors, do not appreciably cover the mucous membrane and thus interfere with its function. These features, in well chosen cases more than offset the difficulties in connection with their use, as the necessity for cutting tooth tissues and removal of pulps, the added difficulty in maintaining hygiene, and other more minor disadvantageous features associated with crown and bridge work.

Frequently, however, conditions are met with in which crown and bridge work in the ordinary sense of the term, seems to be contra-indicated. Among these conditions might be mentioned large amount of absorption with lip exposing considerable gum tissue, lack of suitable roots in suitable locations, and other well known

contra-indications for bridgework. In such instances partial dentures resting entirely on the mucous membrane of the mouth, or directly or indirectly upon the roots of the teeth in conjunction with the mucous membrane of the mouth, are, of necessity, indicated.

Bases.—With regard to the various bases upon which these partial dentures may be built up, vulcanite, gold cast or swaged, aluminum cast or swaged, or swaged platinum may be used. While vulcanite answers the purpose very well, the metallic bases, as is common knowledge to the profession, are greatly superior from a sanitary and esthetic standpoint. Swaged bases should be rimmed, with wire soldered on, giving a good margin to finish the vulcanite. Especial care is necessary here, however, to ascertain the correct outline of the denture before the rim is attached, otherwise in altering for incorrect outline, the rim may be filed off, thus detracting greatly from the neatness and sanitary value of the piece. Care should be taken in constructing swaged gold bases for partial cases, to reswage on the cast and base, a proper reinforcing piece, subsequently sweated to the base, in locations where there is extra stress. Many another wise fine restoration has fallen down under service through omission of this precaution, and partly by reason of its lesser rigidity and largely by reason of the impossibility of sweating or reinforcing pieces is the use of swaged aluminum in partial dentures contraindicated in practically all cases.

Cast Work.—As in the swaged base an elevated metallic margin against which to finish the vulcanite is preferable, and patterns for cast bases should be made with a extra strip of wax around the periphery, giving a much neater and more sanitary margin to the finished denture.

The use of the cast gold for large restorations by partial dentures is contraindicated, owing to its weight, and crystalline, brittle structure if thin enough to be light. Its use is limited to small saddles, not, as a rule, supporting more than four teeth. Cast aluminum is suitable for making parts or the whole of partial dentures, although in the parts of partial dentures, in which attenuated proportions occur, as a narrow strip joining two parts of the denture, the pure aluminum is too pliable, and an alloy, as Bohr's or Brophy's, should be used on account of its greater rigidity.

In connecting cast aluminum parts of a denture with bars of gold or platinum or other metallic parts made of metal other than aluminum better results will be obtained by joining these parts by a vulcanite attachment rather than by casting the aluminum around the bar, or clasp, or whatever the parts may be. In the case of platinum, a species of alloy seems to be formed between the two metals, and the platinum becomes brittle or granular, and in the case of the gold a gas is frequently generated which forms a bubble around the bar, greatly weakening the joint upon which usually a great deal depends.

Teeth.—Regarding the artificial teeth, the occlusal surfaces of these should show fairly deep sulci, especially important if the antagonizing teeth are provided with well developed buccal cusps and deep sulci. (Fig. 1D.) A very considerable amount of extra pressure is needed to masticate food between surfaces which too closely fit each other, and by having convex cusps fitting into well defined sulci, an escape is provided for a small portion of the food which is subsequently comminuted and admitting of the teeth being brought together without too great pressure on the underlying mucous membrane. Figs. 1A and 1C.

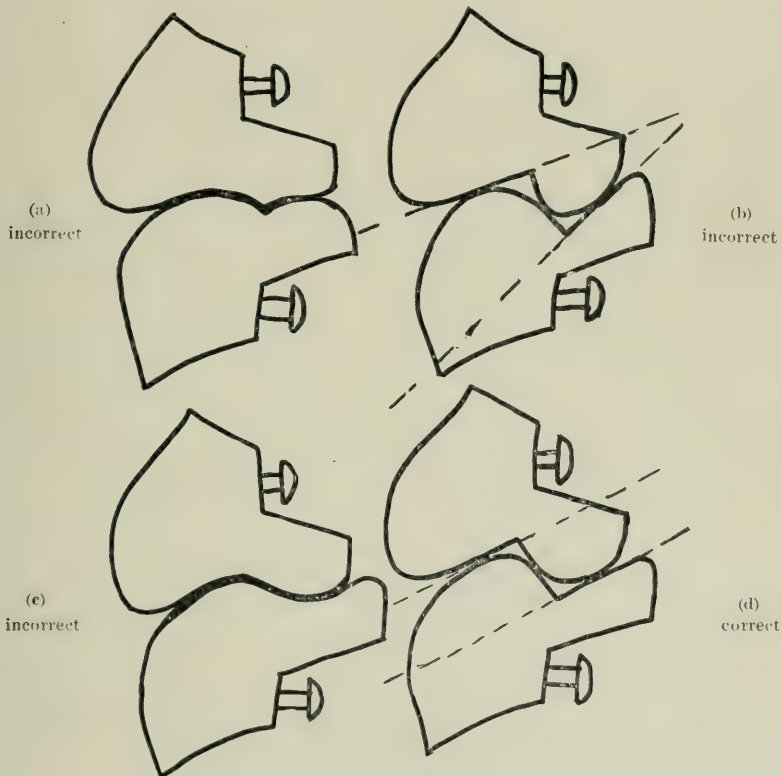


Fig. No. 1. (after Gysi)

Tube teeth, any of the ready-made detachable crowns of the Davis variety, Goslee bridge teeth and similar porcelain may be used in either vulcanite or cast, or swaged metallic work. In vulcanite work they are ground into shape and a headed pin then inserted for attachment to vulcanite, provided there is sufficient space. The bases are then vulcanized, teeth removed, the vulcanite polished between the teeth, and the teeth cemented on. The advantages are the lie-like lingual aspect of the denture and the increased sanitary possibilities of the interproximal spaces. In

cast work they are ground, imbedded in the wax at least 1 m.m., pin fitted, the porcelain withdrawn, casting made and polished, and the porcelain again cemented. In swaged work they are ground, pins fitted, a pure gold cup is formed for the maxillary end of the tooth, tooth with this and the pin are embedded in wax on base, tooth removed, case invested, wax boiled out and heated and cup pin and base soldered together from the lingual side. Steele's facings may be used in denture work, or ordinary facings may be soldered for cast work waxed up, facing withdrawn, graphites inserted in pin holes in wax, case cast, and facing subsequently cemented in. It is not absolutely safe, in the mind of the writer to make a practice of casting directly on the porcelain in every case, especially against diatoric teeth, and especially with aluminum against platinum pins.

Retention.—Properly fitted artificial dentures, whether partial or entire, tend to become displaced from their position by the following forces: Gravity in uppers, the displacing action of the adjacent muscles and their overlying tissues, and the displacing action of the opposing teeth. Against these forces in a denture are opposed in partial dentures, one or all of the following: Adhesion, gravity, interlocking between teeth, clasps or special interlocking devices.

Adhesion depends upon the complete exclusion of air from beneath a denture while in its position in the mouth. This depends in turn upon (1) the proper adaptation of the base to the mouth, which is usually a surface of varying density; (2) the area of contact, for naturally the adhesion is proportional to the area of contact; (3) the character of the base; a base of slightly granular surface as vulcanite or cast metal being more adhesive than polished metal; (4) and the viscosity of the saliva, the more viscid saliva excluding the air to better advantage. The maximum adhesion is provided for largely in the manner of preparing the tray and manipulation of material in taking the impression, is retained by the intelligent formation of the model. is improved in the slight alteration of the model, after it is formed to compensate for various differences in density of the tissues, and, especially in the vulcanite base, is preserved by careful technique in changing of the wax to vulcanite base.

The clasp as a means of retaining partial dentures in the mouth probably stands first in point of antiquity, and has one great recommendation: it does not require any sacrifice of tooth tissue. For this reason and a very good reason too, has it been handed down through the generations, and comes to us very much in its original form. Unfortunately, however, it has been abused, and to many a conscientious operator the fitting of a clasp is always attended with misgivings. While it must be admitted that the application of a clasp to a tooth may to a certain extent endanger it, yet there are thousands of these in use to-day and no evil results attending.

Fitting of clasps closely following the gingival margin, fitting of clasps to dentures which settle and force the clasp into the free margins of the gum, fitting of clasps of insufficient width and the fitting of clasps to teeth with poor enamel and peridental conditions, constitute a few reasons for evil results following their use.

Mention might here be made of the idea first advocated by Bonwell of carrying a spur from the clasp upon the occlusal surface of the tooth, preferably of irridio-platinum wire soldered to clasp, or clasp metal reinforced with solder. This prevents to a large extent undue settling, thus protecting the gingival margin, and is especially useful in conjunction with the "bar" for joining the two saddles of an ordinary bar lower supplying the lower six or eight posterior teeth.

The special interlocking devices which are better known and are made most frequent use of to-day are composed of two parts, one which is attached directly or indirectly to the tooth as on an inlay or crown, and the other part which is attached to the removable bridge or denture supplying the teeth. Of these the Condit, Griswold and Morgan attachments comprise of sliding members which must be parallel and which lend to the removable section support from the natural teeth. The difficulty with these attachments is that any settling or change of position under stress, either of the denture or of the teeth bearing the attachment throws the appliance out of line. However, in many well chosen cases they are used with great satisfaction.

The Roach and Gilmore attachments are two later developments and differ from those previously mentioned in that the same necessity for absolute parallelism does not exist. The Roach attachment, as is well known, consists of a ball working in a split tube of springy metal. It renders possible, as do the others in this class of attachments, the construction of dentures touching very little tooth substance, a great advantage needless to say, and also will allow for the settling of the dentures, a feature not always found in other attachments of this class.

The Gilmore attachment, although before the profession a short time bids fair to adapt itself to great advantage in many otherwise perplexing cases. The element which is fastened to the tooth is a 14 gauge stiff irridio-platinum wire, the element which is attached to the denture a small clasp which embraces the wire, with wings for attachment in vulcanite or for soldering. While there is no provision for the settling of the denture, as in the Roach, yet its possibility seems very extensive, and it seems commendable to the profession as a most simple and ingenious device.

Mention might here be made of the use of the bar in upper and lower. The most frequent case is that of the lower six or eight anterior teeth in position, the balance absent. The use of the bar, not in contact with the remaining teeth, or the ridge, is an immense-

ly superior restoration, in most cases, over the strip of vulcanite or reinforced gold (stringer) in contact with the teeth.

A very important principle brought to the notice of the profession simultaneously by Dr. Fossume, of New York, and our own Dr. McDonagh, involves the junction of two teeth at the end of a space by a square iridio-platinum wire, following the gum line, dividing support to the saddles resting on it with the gum underneath. It is a principle of greatest possibilities, as will be illustrated later in the evening. The Bennett attachment is somewhat similar, only receives its support from one end of the edentulous space.

Examination.—Regarding the examination of a case, and the describing of an appliance, a great many mechanical considerations must be weighed in the mind and given proper value for the particular case, which, by the way, is occasionally so complex in its demands as to require the correct setting of the models on the anatomical articulator for study. The necessity of coming into contact with as few teeth as possible, the desirability of securing occlusion on both sides of the mouth, the advisability of, in small edentulous spaces, securing the support of the adjacent teeth, the necessity for providing for the settling of the denture, especially lowers, the firm support of any loose teeth, are only a few considerations which might occur to the mind in designing an appliance.

Procedure.—Regarding the general procedure in partial denture work, a few comments might be considered to be in order. Concerning the impression, the tray should be cut down opposite the vacant spaces until contraction of the lips and cheeks fail to dislodge it. The newer forms of impression trays are made with a removable handle, facilitating this. The material should be plaster in most cases, a little on the stiff side, putting the tissues of varying density under the same stress as under the denture in function. Immediately after the impression is inserted the patient should be instructed to contract the muscles of the lips and cheeks; in other words, asked to try and dislodge the impression against the pressure of the operator's index finger. This gives in the impression the proper outline for the denture. In locations where the denture must touch the teeth the plaster should be bevelled at the gingival margin, preventing too close a fit at this point. In cases where the denture need not fit around the gingival margin of the natural teeth, they may be dried, and a soft wax passed in between the interproximal spaces, facilitating the subsequent removal of the plaster impression.

Model.—In the formation of the model, care must be exercised in order to avoid inaccuracy. A rapid-drying separating medium should be used, and the plaster of the model introduced into the plaster of the impression as soon as possible, so that any extension taking place takes place almost simultaneously between the impression and the model. Plaster should not be stirred over ten seconds.

Should be sifted into lukewarm water, the bowl revolved, and the spatula making a sidewise cutting movement. The model should be heavy over the thinnest portion in order to be sufficiently strong to prevent buckling, and the tray should be removed as soon as the plaster is sufficiently set.

Compensation.—If the denture covers the vault, an examination covering every square millimeter of the vault should be made, locating the hard and soft areas. Fig. 2. For vulcanite work a soft

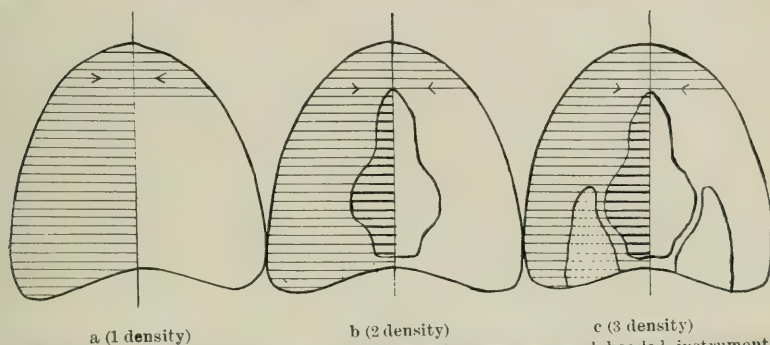


Fig. 2.—In examination of mouth for hard and soft areas, a round headed instrument is held lightly in the hand and drawn across the vault as indicated by cross lines, one side at a time, from ridge to median line. In vault A no difference of density is encountered, in vault B the instrument climbs up a hard central area outlined in centre, in vault C hard area in centre and soft area on either side are detected.

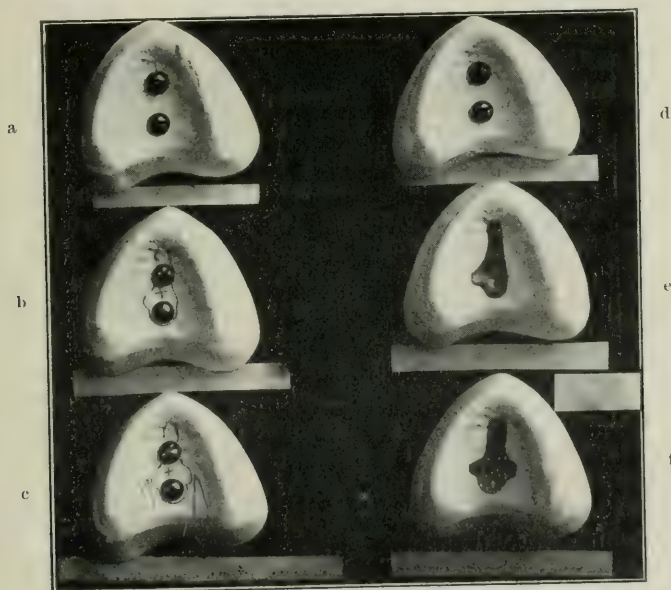


Fig. 3.—Showing compensating treatment for models for vulcanite.

- (a)—Model for one density vault.
- (d)—Treatment for one density vault. (none)
- (b)—Model for two density vault.
- (e)—Treatment for two density vault. (metal lift corresponding to hard area)
- (c)—Model of three density vault.
- (f)—Treatment for model of three density vault (metal lift and soft area scraped)

metal lift pinned on the model, corresponding to the hard area, is suggested, and for the soft area the model is scraped. Fig. 3. For swaged work the lift is placed on the metal cast and the base reswaged upon it; for cast work, the reverse process is done in the impression before the model is made, scraping the hard spots and adding wax for the soft.

Bite.—In taking the bite, a trial plate, with built-up wax rim, should, in most cases, be used, made of hard wax or similar material, after the operator's choice. Antagonizing teeth are best reproduced in Melott's metal, poured into a plaster impression running half-way down the crowns of the opposing teeth. In the mind of the writer, in restorations involving losses of any extent in the bicuspid and molar region, the models should be placed in an anatomical articulator, with a face-bow or its equivalent. The joint slides should be set at an angle corresponding to the descent of the condyle in the patient's temporo-maxillary articulation, by the protrusive bite or its equivalent, which requires probably from five to eight minutes' additional time. Pronounced inclinations, as 45° , require deep lingual cusps, with well-defined sulci, set in a pronounced curve of Spee; lesser inclinations, less depression of the lingual cusps and lesser curve of Spee. If, in setting the teeth and taking cognizance of these facts, one is often surprised at the masticating efficiency which can be given to even partial dentures against natural teeth far removed from their original positions.

The choice of teeth and alteration of same to harmonize in color, form and arrangement with the remaining natural teeth, is a task which involves the highest artistic talent. Grinding to imitate an exposed root, an erosion or characteristic facet worn on the corresponding tooth, staining for defective enamel, tobacco stains, etc., are only a few of the possibilities involved. It is always advisable to try the case in just before vulcanizing or soldering, and to show to the patient, whose comments are very often valuable in establishing a harmonious restoration.

The appliance having been fitted to the mouth to the satisfaction of both parties, the patient should never be dismissed without proper instruction as to the maintenance of proper hygienic conditions. The removal of, and immersion of, the denture over night in bicarbonate of soda solution, careful cleansing of the teeth and denture after taking food and at night before retiring, are suggestions which are valuable.

In conclusion, the writer desires to express a belief that in no branch of prosthetic dentistry is required a higher order of skill, ingenuity, knowledge and artistic feeling than in the successful restoration of part of the natural denture, and that in no branch of dental prosthesis is there a wider field for development of principles of design which restore appearance, masticating efficiency and good health and happiness to semi-edentulous humanity.

BAR UPPER PARTIAL DENTURES.

J. A. BOTHWELL, D.D.S., L.D.S., TORONTO.

Read before the Toronto Dental Society, February 12, 1912.

About four years ago, Dr. Roach, of Chicago, visited the Toronto Dental Society, and after listening to his description of bar-lower partial plates, I conceived the idea of bar-upper partial plate and began a trial of them.

These plates are made of a saddle of vulcanite or metal and joined together by a bar across the roof of the mouth as far back on the hard palate as possible. The bar is placed about the thickness of cardboard from the roof of the mouth except over hard spots, when it is placed about twice that distance away. The saddles cover the ridge and project far enough down to give the plate good support. If the saddles are made of metal, the bar should be soldered to the saddle, but if vulcanite is used the bar should be flattened and notched or have holes put through it so that it will be held lightly into the vulcanite.

A good wide clasp is about the best attachment for holding these plates, although any kind of modern attachment, *e.g.*, Roach, Gilmore and Bennet may be used. The attachments give best service when placed on opposite angles of the case.

I have used a great many of these dentures, and can highly recommend their use whenever it is possible to use them. The patients like them because they leave the roof of the mouth practically free, interfering with neither taste nor speech. If you try them I am sure you will be more than pleased with the results.

SEMI-REMOVABLE PARTIAL DENTURES.

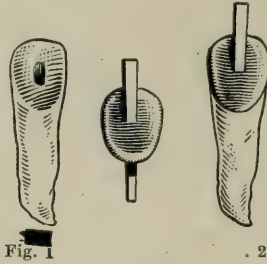
W. J. WOODS, D.D.S., L.D.S., TORONTO, ONT.

Read before the Toronto Dental Society, February 12, 1912.

The upper central and lateral incisors, left first bicuspid and right bicuspid, and first and second molars were extracted twelve years ago, and vulcanite denture has been worn since that time. For the last four or five years natural teeth have been substituted for porcelain on the denture. About four years ago the right cuspid showed signs of loosening, and when case was presented, this tooth was quite shaky and evidently could not have been retained much longer if the use of an ordinary denture had been continued. About a year ago the gums, palate and teeth commenced to get tender, so that lately the patient could hardly tolerate his denture and could get very little masticating use of it. He had been considering ways and means of improving this condition for some time when he came to me in November.

DESIGN OF TREATMENT.

After taking an impression of the upper, and casting for study model, we decided to use a semi-removable appliance. The fixed part to tie the cuspids to one another and to the posterior teeth, and the removable part to supply the lost teeth. It was quite evident that unless something was done to hold these cuspids firmly in



position they could not long be preserved. We decided to devitalize the cuspids, and when the root canals were filled, the lingual surfaces of both were ground to allow for a good substantial thickness of metal for a strong attachment. We had decided to open the bite slightly by this time also, as the cuspids were rather long in appearance, and this would give us a better chance to set centrals and laterals to a better line.

TECHNIQUE.

The caps for the cuspids were prepared by burnishing well-annealed platinum plate, about gauge 35, to the lingual surfaces. This may be very readily done by using a large, round-headed burnisher and working platinum to place directly over canal opening, piercing with a pointed instrument and forcing irido-platinum posting, gauge 14, to place in canal. This was then removed and attached with solder, replaced and burnished to tooth as shown.

Gold crowns were then made for the left bicuspid and the right molar, taking care to open the bite the required distance. These gold crowns were made by first fitting the bands and then casting the morsal surfaces after.

With these caps and gold crown in position an impression was taken of each side. The right cuspid and molar and the left cuspid and bicuspid were then joined together with No. 14 gauge irido-platinum posting square. This posting was made to conform to the gum line, but just free from the gum, care being taken to see that the perpendicular planes corresponded, one side to the other. These two pieces were placed in the mouth and an impression was taken—and, by the way, these were all plaster impressions—and the cuspids joined in the same way.

This gave us a very rigid skeleton, as it were, which, when placed in the mouth, went home with a snap, and you may be sure there were no more wobbling movements to the cuspids.

You will now no doubt see the importance of keeping the vertical planes of these bars to the same horizontal line, so that a snug-fitting denture would draw.

An impression was carefully taken with this in place, and when removed the appliance was not placed in the impression, but a

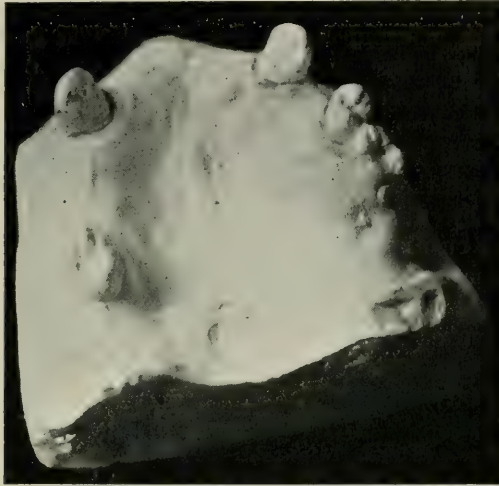


Fig. 3—Study Model.

mallet cast was made direct, and was trimmed slightly when necessary to keep the angles sharp. Platinum foil was swadged to this in the form of a rim denture. Just before final swadging, strips of tinfoil, gauge 30, and width of connecting bars, was placed in

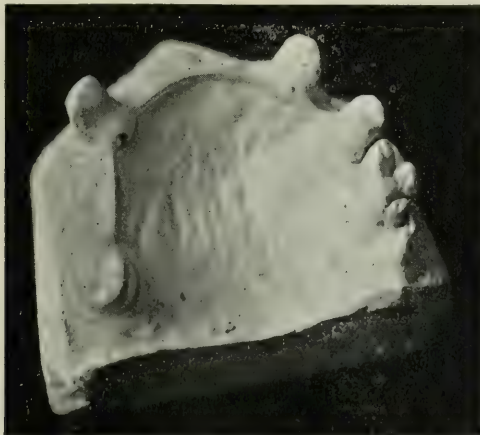


Fig. 4 Skeleton in Position.

corresponding slots in denture, so that the denture would fit snug to palate and gums. This was then strapped with pure gold, gauge 30, to stiffen. After fitting in the mouth and finding it satisfactory,

another impression was taken and cast in investment material, the denture removed and a small square swadged slot was cut into the mass of solder on the mesial surface of molar crown just above the bar. A small, square irido-platinum bar was fitted to this slot, denture replaced, this small bar fastened to it with hard, sticky wax, the whole removed, invested and soldered. A gold clasp was made to fit the bicuspid crown, free of gingival margin, and this was fastened, as before, to denture nad soldered. A knob was then soldered on the buccal of the crown about midway up to give a better hold for clasp.

This left still another point where we considered a lock necessary, namely, on the lingual surface of the right cuspid. This was accomplished by cutting a shallow groove in the mass of gold on the lingual of the cuspid, just slightly more close to the gum line than the upper line of the connecting bar, and another spring clasp adjusted to this, and proceeded with as before. This gave us a denture that went to place with a snap, and which could practically only be removed in one way: by exerting downward pressure on the denture in the region of the right cuspid.

After satisfying ourselves that the adjustment was perfect in the mouth, we proceeded to select suitable teeth. Dowel crowns were our choice, but we could not get a good selection, so finally, natural teeth were procured that made a very good match, and we decided to use them. These teeth were constantly kept in water to keep them from getting brittle.

The next point was how to use them without having the unsatisfactory results usually obtained, namely, the lack of retention and the tendency to decay.

These teeth were prepared by cutting off the roots and grinding



Fig. 5—Labial View of Denture.

roughly to place. With a suitable size bur, an opening was drilled through the pulp chamber into the crown of the tooth in such a manner as to resemble a dowel crown, and after bevelling margins

a base was swadged on, a pin fitted and soldered. The teeth were then set in position and these little caps stuck to place with wax.

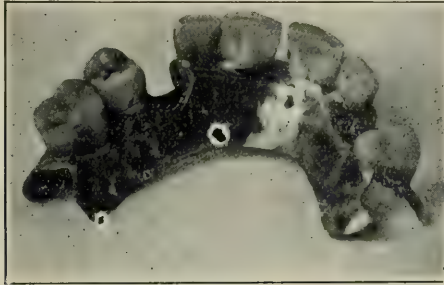


Fig. 6—Lingual View of Denture.

The teeth were removed from the denture, which was then invested and soldered. The teeth were then replaced and the case waxed up for gum.

In making these metal bases for the teeth, care was taken to have them come over the labial margins just short of where we intended finishing the gum line. The case was invested and vulcanized without putting the teeth through the vulcanizer.

When these teeth were cemented to place the area of liability of decay was limited, and the attachment strong. The other part was then cemented on the teeth in the mouth, the denture inserted, and the case was completed.

ELECTRICITY FOR DENTISTS.

FRANK D. PRICE, D.D.S., L.D.S., TORONTO.

CHAPTER VI.—MAGNETISM.

The word magnetism probably is derived from Magnesia, a province in Asia Minor, where in ancient times a kind of stone suspended by a fine string would not rest until it had placed itself in a definite relation with the supposed daily path of the sun around the earth. Its charm was sought in war or in more peaceful pursuits to lead to success, hence it was called "lodestone," which in old English meant leadstone. We now know that these were stones of magnetic iron ore, and were in reality *natural magnets*.

If a piece of pure soft iron be brought in contact with a natural magnet, it acquires its properties and becomes an *artificial magnet*. The magnetism thus acquired is called *induced magnetism*. If the soft iron be removed from the influence of the other magnet it at once loses its *magnetic* property and so has been a *temporary magnet*. If instead of soft iron a piece of hardened steel be brought near a magnet, it also becomes an artificial magnet, but it retains its magnetism indefinitely, and so is a *permanent magnet*.

Suppose a permanent magnet be in the shape of a bar (Fig. 33). It will be found that at least two places on the bar, usually the ends, strongly attract a piece of soft or unmagnetised iron, which, if brought in contact, can be separated again only by considerable force. These centres of attraction are called the *poles* of the magnet. If two permanent magnets be brought near each other, it will be found that one pole of one magnet strongly attracts one pole of the other magnet, but as strongly repels the other pole.

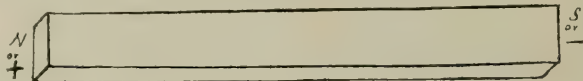


Fig. 33

It will thus be found that the two poles of the same magnet have opposite influence toward poles of another magnet, and so are specifically named. If a bar magnet be suspended from its centre by a thread, it will always place itself in a north and south position. Hence the end that points north is named the *north* pole, also called the *positive* pole, and the other end is called the *south* or *negative* pole. The magnet is influenced by the earth to take the north and south position. In the next chapter on electro-magnetism, we can understand that the earth is a huge magnet, probably induced by electric currents passing around the earth from east to west produced by the sun's heat. And if the earth is a magnet, we can probably understand the action of the compass needle, which is a small permanent bar magnet. With regard to magnets, the following law is true,—*like magnetic poles repel and unlike poles attract each other.*

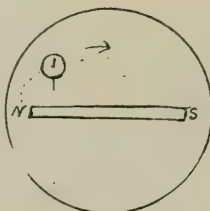


Fig. 34

The influence of magnetism may be shown by experiments. Lay a permanent bar magnet in the bottom of a glass vessel and pour in 2 or 3 inches of water. Obtain a small sewing needle that has been magnetised, and pierce it through a cork, leaving nearly all the needle with its north pole on one side of the cork. Place the cork over the north pole of the magnet with the north pole of the needle suspended just over it, then watch it move.

The north pole of the needle will be repelled by the north pole of the magnet, and the needle will move in the line indicated (Fig. 34), toward the south pole of the magnet, where it will be strongly attracted. Lay a piece of cardboard over a bar magnet and dust over it iron filings, and they will arrange themselves as in Fig. 35.

Thus we see that there is a space about a magnet in which the force of magnetism acts, and this space is called the *magnetic field*. We

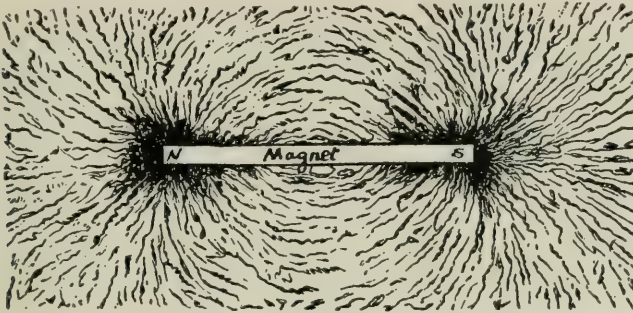


Fig. 35

see also that the attraction acts in definite directions, which are called the *lines of force*. It is customary for convenience to speak of the magnetic lines of force as passing out from the north or positive pole and in at the south or negative pole (Fig. 36). Also that the greater number of lines of force the more *magnetic flux* or magnetic force. This depends both on the degree of *saturation* of the magnet and also on the shape of the magnet. If the bar be

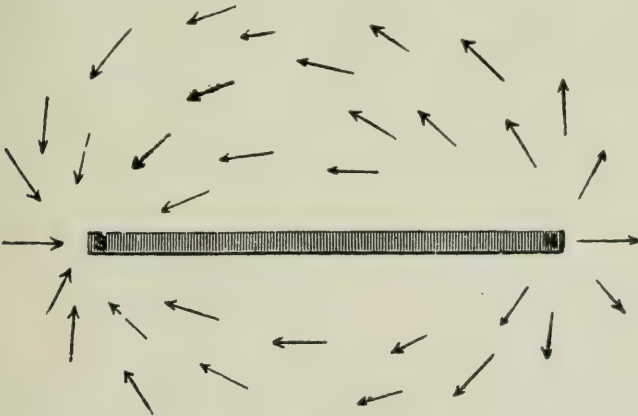


Fig. 36

curved to bring the poles near together, as in the *horseshoe magnet*, the lines of force are shortened and the force or flux is greatly increased. Hence we shall find in the next chapter that electro-

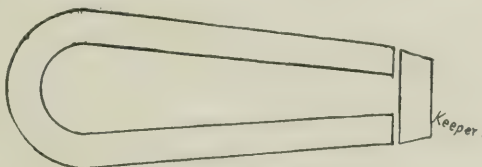


Fig. 37—Horseshoe Magnet

magnets usually take this form. Of all the metals, iron is the best one to possess and retain magnetism. Iron also appears a good conductor of magnetism, better than air. Hence a *keeper* is usually furnished with a horseshoe magnet (Fig. 37), through which an equilibrium is established between the poles. It greatly assists a permanent magnet in retaining its magnetism.

The property of magnetism appears to be on the surface of a magnet. Hence magnets are built up of thin iron plates fastened together and often insulated from each other by varnish. Such a magnet is *laminated*. We shall find that the best motors are laminated.

The most generally accepted theory of magnetism is that it resides in the molecule. Experiments confirm this belief. Magnetise a hack-saw blade. It will possess two poles and be neutral in the middle. Break it in two in the middle and each fragment is a perfect magnet. File a permanent magnet to powder and put the filings in a glass tube. Tap the tube to assist any movement that the filings are inclined to take, and they will be seen to arrange themselves like magnets, the north poles of some particles attached to and satisfied by the south poles of other particles. Ewing has advanced the theory represented in Fig. 38. Before magnetization the molecules are arranged in geometric forms, as at A, each having its polarity satisfied, so that there is no magnetic influence outside the iron bar. The force that magnetises the bar causes the molecules to arrange themselves so that all the magnetic fields are parallel. This to satisfy the magnetic poles of the molecules causes the positive poles of the molecules to be toward one pole of the magnet and the negative poles toward the other end. Thus there are free positive poles at one end and free negative at the other end, as at B.



Fig. 38 Unmagnetized

Magnetized

It is more difficult to magnetise hard steel than soft iron, as if the molecules moved less easily. Hard steel retains its magnetism as if the molecules once arranged could not easily return to their former positions. Heating a permanent magnet causes it to lose its magnetism, and heat aids molecular movement. Jarring a magnet causes it to lose its magnetism, and jarring might assist the movements of the molecules. When a bar is magnetised it increases in length, which may be due to a re-arrangement of the molecules. Soft iron retains very little magnetism.

We have noted positive and negative polarities and attractions in static electricity. We have noted the same in galvanic batteries and in electric currents. We have also seen it in magnetism. Hence there is a close relationship between these different forms of

energy, if indeed they are not but different manifestations of a common form of energy. The relationship between electricity and magnetism will more definitely appear in the next chapter.

CHAPTER VII.

ELECTRO MAGNETISM.

A current of electricity acts in many ways like a magnet. If iron filings be scattered on a horizontal card and a wire through which electricity is flowing be carried through the card and at right angles to it, the filings will arrange themselves in concentric circles

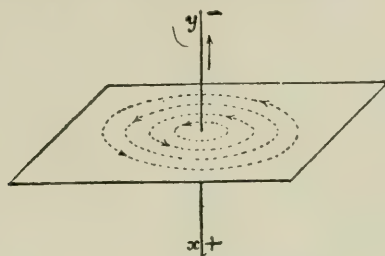


Fig. 39

around the wire (Fig. 39). Tapping the card will assist the movement of the fine iron filings. Note that the lines of force are all parallel to each other and are all at right angles to the direction of the electric current in the wire. A magnetic needle free to move places itself with its positive pole north and its negative pole south.

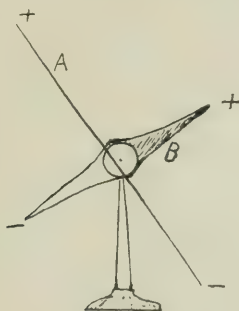


Fig. 40

If a wire carrying a current of electricity be placed close to the needle and parallel to it, the needle will at once endeavor to take a position at right angles to the wire (Fig. 40). By reference to Fig. 39 it will be seen that the needle places itself parallel to the lines of magnetic force. Not only are there two opposite polarities in an electric current and in a magnet, but also in the lines of force surrounding an electric current in a conductor. (See Fig. 39). If a person's body were the conductor and the current flowing from the feet toward the head and the magnet be across in front, the positive or north pole would be toward the left hand and the

negative toward the right hand. (See Fig. 40). From this reasoning it is not difficult to understand the force produced by a solenoid or coil of wire (Fig. 41). All the lines of force inside the coil are



Fig. 41

parallel and in the same direction. *The magnetic force of a coil is proportionate to the strength of the current multiplied by the number of turns in the coil.* A solenoid acts as a magnet, possesses positive and negative poles (Fig. 41), will attract iron and, like the magnetic needle, will place itself at right angles to a current of electricity if free to move.

If a piece of soft iron be placed in a solenoid it becomes a powerful magnet. The iron offers an easier path for the magnetic force

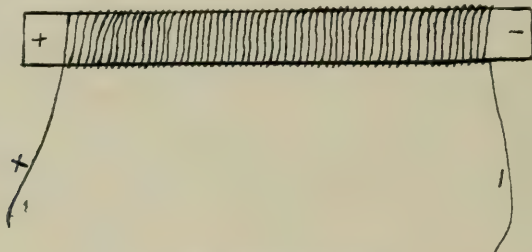


Fig 42—Electromagnet

(Fig. 42). And the power of the magnet up to its saturation depends upon the strength of the current (in amperes) multiplied by the number of turns in the coil. An electro-magnet is many times more powerful than any permanent magnet. And if the bar electro-

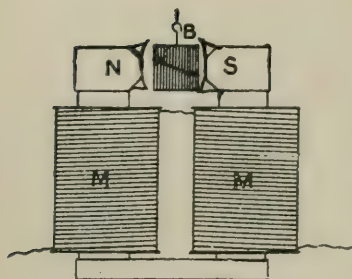


Fig. 43 (a)

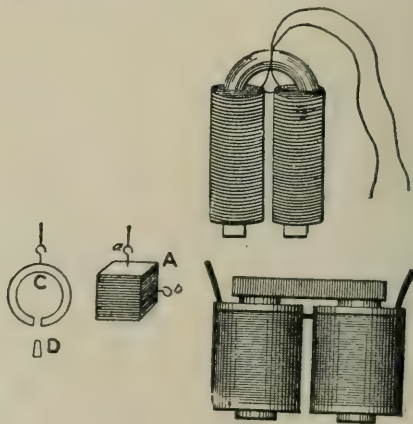


Fig. 43 (b)

magnet be bent to bring its poles near together (Fig. 43), its effectiveness is again many times increased. A represents a form such as is used in electric bells, while B is a simplified form of magnet such as used in motors and dynamos.

ELECTRO-DYNAMICS.—*An electric current is set up in a closed circuit when it cuts lines of magnetic force.*

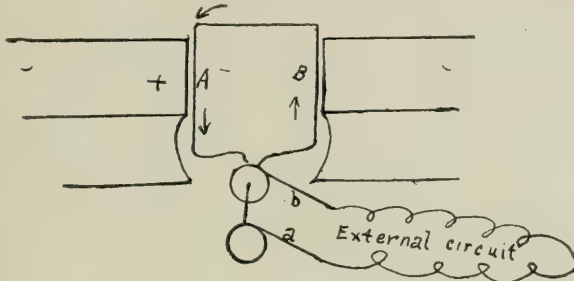


Fig. 44—Representing one turn of armature winding

In Fig. 44, let $+$ and $-$ be the positive and negative poles of an electro-magnet. A B is a copper wire. The arm A terminates in a ring upon which the metal spring *a* rests, to keep contact while the ring rotates. The arm B also ends in a ring, which has the spring *b* in contact, and which is insulated from A. *a* and *b* are joined together by an external circuit. A and B may rotate around a common axis, and we have continually a complete or closed circuit. If A be moved downward in the direction of the upper arrow across the magnetic field of the $+$ pole of the magnet it cuts through the lines of (magnetic) force of the magnet and a current is induced in A indicated by the arrow. Magnetic energy is changed into electric force. In an instrument such as suggested in Fig. 44, while A moves downward B moves upward through the magnetic field of the $-$ pole of the magnet, for every magnet must have two or more opposite poles. There is induced in B an electric current which is added to A in the closed circuit. Now, will the reader follow a bit of mental reasoning? Note that the arrow at B points away from the rings and the arrow at A toward the rings, and from that note the direction of the current in the closed circuit B A a b. If the Armature A B rotate until B is crossing the positive pole and A the $-$ pole, the arrows at the $+$ and $-$ poles will still represent the direction of the current, but then the $+$ arrow will show the direction of the current that is carried out to *b* and the $-$ pole the arrow to *a*, so that the direction of the current in the external circuit will be reversed. Thus with each rotation of the armature we have a current in both directions, or a complete cycle. If the armature could rotate 60 times in a second we would have a 60 cycle alternating current. Instead of having two magnet poles, we may have any even number, say 10, that is 5 $+$ and 5 $-$ placed alternately $+$ and $-$ in a circle, which we call the field, inside of which the armature rotates. The armature would

then have a corresponding number of windings, each terminating in the two rings. The armature in this case needs to rotate 6 times in a second to produce a 60 cycle A C, instead of a single turn, as A B in Fig. 44. Let there be 100 or 1000 turns in each *winding* and we get 100 or 1000 times the pressure of current produced, or voltage. Again, instead of having the wire circuit alone to be influenced by the + and — magnetism, let the windings A and B be around an iron frame or *core*. We know from the preceding part of this chapter that this iron core will become magnetised. It becomes magnetised in two ways. When A (Fig. 44) is passing the positive pole and B the negative, and a current is induced in A B, this current magnetises the iron core that it surrounds. This tends to produce a — pole in the core opposite A and a + pole in the core opposite B. This polarity in the core is intensified by the + and — poles of the *field*. Here is another rule. *Any change of magnetism in an iron core induces a corresponding electric current in a closed circuit that surrounds it.* The change of magnetism in the iron core of the armature induces quite as much current in the windings as the passing of the windings through the magnetic fields of the field magnets.

The strength of the current in amperes produced is in proportion to the strength of the magnetic flux divided by the resistance of the wire in the armature coils. For a high amperage it is necessary to have large enough copper wire to avoid heating and resistance, and the turns of wire must be well insulated from each other and from the iron core. We have seen that magnetism resides largely on the surface of the iron, so that the magnetic flux is greatly increased by having plates or rods of iron assembled in form both for the magnets of the field and the armature.

The voltage or electric potential is in proportion to the rapidity with which lines of magnetic force are being cut, and this we can see is in proportion to the number of turns of wire in each coil of the armature and on the speed with which the armature is made to rotate.

The rapidity of the cycles (or alternations of the direction of the current) depends on the number of magnetic poles in the dynamo and the rapidity of the rotation of the armature.

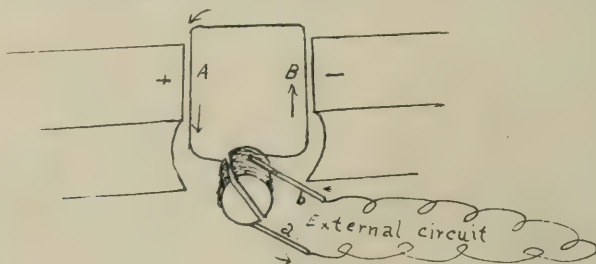


Fig. 45

In Fig. 45, the ends of the wire A B are led to *segments* of a

circle which are insulated from each other. These are mounted on the axis of the coil A B to rotate with it. The assemblage of segments with insulations and connecting parts is called the *commutator*. Following our reasoning in regard to Fig. 44, as A cuts the magnetic lines of force of $+$ and as B cuts the lines of force or passes through the field of the $-$ pole, a current is induced in A and B as indicated by the arrows at A and B and *a* and *b*. But when B passes the $+$ and A the $-$ poles, then A segment is in contact with *b* brush and B segment is in contact with *a* brush, and while a current is actually passing through A B in the opposite direction, yet by the change in the segments of the commutator it passes out at *a* and *b* in the same direction as before. Thus we have a *continuous* current in one direction, also called *direct* current or DC. The same facts hold true with regard to the windings of the armature core and the output in amperes and volts, as in the AC dynamo. The only practical change in the machine is that for DC we use a commutator instead of the rings of AC dynamo.

The $+$ and $-$ might be the poles of a permanent magnet, but we have learned the advantages of an electro-magnet over a permanent magnet. With the DC dynamo we may run a *shunt* line or branch from the brushes *a* and *b* to a coil that magnetises the field, as in Fig. 46, and we have a *shunt wound dynamo*. Or we may connect the field in series with the brushes *a* and *b*, as in Fig 47, and we have a *series wound dynamo*. Or we may use both connections in the same machine and we have a *compound wound dynamo*. (Fig. 48.)

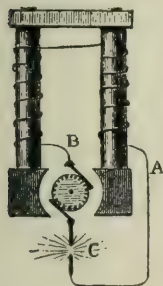


Fig. 46

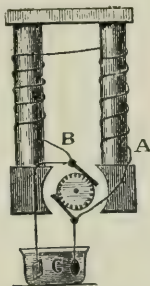


Fig. 47

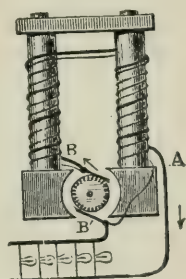


Fig. 48

It is evident that the poles of the field must not change, or, in other words, must be *constant*. The current produced by the AC dynamo would change the polarity of the field with each alternation. Therefore, the fields of the AC dynamo must be magnetised by a separate and a DC dynamo, as in Fig. 49.

The principal remaining the same, it does not matter whether the armature of the dynamo or the field rotates. In very large dynamos like those installed at the power plants at Niagara Falls, it is usually the field that rotates. That part of a dynamo or motor that rotates is called the *rotor*, whether it be the field or the armature.

It can be understood that it requires as much mechanical force to turn the rotor as the dynamo produces electric energy plus the friction of the bearings, which latter is not much. It is like tearing the electro magnets of the armature away from the field magnets of opposite polarity continually. Hence the dynamo is an instru-

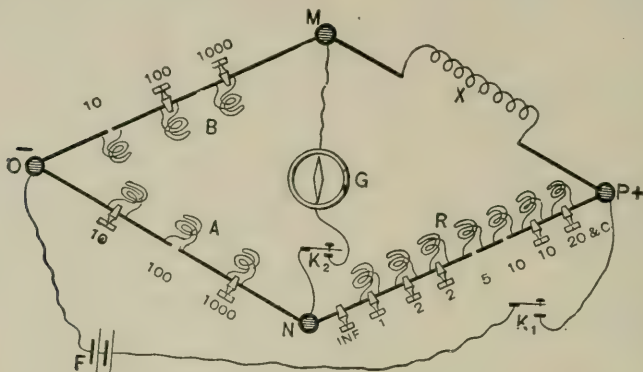


Fig. 49

ment for transferring mechanical force by means of magnetism to electric energy. The mechanical power of steam or water is commonly used because of its cheapness. The Niagara Falls power plant and distribution of electricity will be dealt with in Chapter IX.

At the Vienna exposition in 1872, two dynamos were coupled together as two galvanic cells might be coupled supplying a needed current of electricity. When less current was needed the driving belt was thrown off one of the dynamos. The engineer was surprised to see this dynamo immediately start its armature revolving in the opposite direction, attaining about the speed it formerly had. He had not separated the wires connecting it to the other dynamo and it had become a motor. This was the first practical application of driving a motor by current produced by a dynamo.

A motor has the same parts as a dynamo, and is practically the same machine. The action of a motor is the reverse of the dynamo in so far as power is developed. The magnetism in the armature poles is developed a little in advance of the field magnets, so that there is a continual attraction between the field magnets and armature magnets of opposite polarity. This relationship between the magnets of the armature and the field is determined by the position of the brushes on the commutator.

Motors are usually *shunt wound*, because these maintain a nearly constant speed under varying loads. For light work or for variable load, as for driving street cars, motors are often *series wound*. Dental motors will be described under the heading, "Power in the Dental Office."

The speed of a motor is usually regulated by varying the amount of current through the armature. This is usually accomplished by

a rheostat, which is described in the next chapter. Reverse motion is obtained by changing the direction of the current through the armature or the field, but not both. The mechanism for reversing is usually combined with that for controlling speed, so the reverse is in such cases through the armature. A brief comparison is in order here. When by some mechanical power we cause the armature of this truly wonderful machine to revolve, we cause electric conductors, which are the windings on the armature, to cut the lines of magnetic force of the field magnets, and so generate a current in the conductor if it is a closed circuit. Thus we have the dynamo. If, on the contrary, we send a current through the windings of the armature and field coils, we produce magnetic fields which continually attract each other and so cause the rotation of the armature. Thus we have the motor. A motor, however, when it is working, is always generating a current in opposition to that which propels it. This is called a *counter electric pressure*. This counter current is always less than the driving current, the difference being just the energy consumed by the motor in running and whatever mechanical work the motor may be doing. Thus a motor is practically consuming only as much electric energy as is needed for whatever work it is doing. When running light a motor throws back on the line nearly all the current it receives.

A well-built motor is more powerful than any gasoline or steam or similar engine of the same weight. The motor is smaller, quieter, and usually lasts several times as long, because of the absence of reciprocating machinery; the motor having only one rotating axle, which by magnetic attraction may be so lifted in its bearings as to reduce friction to a minimum.

PRESIDENT'S ADDRESS.

ANDREW J. McDONAGH, L.D.S., TORONTO.

Read before Canadian Oral Prophylactic Association, January 8, 1912.

Gentlemen:—

Another year of history is added to our Society. Since our last meeting many things have happened which I have to relate to you, some of them pleasing, some not so pleasant—all taken together making a year of work and one of usefulness, we hope.

You, who have read the annual report of the Educational Committee, Ontario Dental Society, in the November number of the DOMINION DENTAL JOURNAL, will notice that there was mention made of a meeting between that Committee and your Executive having taken place on Tuesday, December 6th, 1910. That meeting I did not think worth while reporting in my last annual address, because we did nothing absolutely new, and made no definite agreement.

Our object, which we made plain at that meeting, is and has always been, to distribute all moneys coming into our care to charity and education, through, if possible, a committee representative of the dentists in the different Provinces.

The members of the Executive of the so-called Educational Committee, other than myself, wanted me to promise for the Canadian Oral Prophylactic Association that we would not give assistance to any society in Ontario, except through them.

I believed that would not be according to your wishes, and refused to do so, the other members of our Executive agreeing with me.

The ground we took was that it would not be right for us to allow ourselves to be used as a weapon to coerce any dental society to bow to the dictates of a committee which was anything but representative, even of the Society it was supposed to represent.

The great stumbling block, of course, was the Hamilton Dental Society.

Two years ago they had a representative on the Educational Committee of the Ontario Dental Society. A year ago their representative was cut off, probably through an oversight due to the haphazard way in which the Educational Committee was formed.

The Secretary of the Executive of the Ontario Educational Committee, on his own authority, as far as my knowledge went, wrote to the Hamilton Society, or somebody in the Hamilton Society, giving them the privilege, or inviting them, or something of that sort, to appoint a representative on the Educational Committee.

However, the Hamilton Society thought they could run their own affair, and did not appoint anybody. And as you see by our financial report, we recognized their right to do so, and to-day, gentlemen, I cannot see how we could act in any other way.

I do not see why one society has not as good a right to our funds as another. Notwithstanding the fact that every man on our Executive has the same feeling on that point as I have, after the formal meeting between the two Executives, the other three members of the Ontario Executive thought that in the meeting we had agreed to distribute our funds to no society except through the Executive of the Ontario Educational Committee.

Another point which was the cause of a misunderstanding at that meeting, or rather, afterwards, was the representation of the C.O.P.A. on the Educational Committee to be formed at the next meeting of the Ontario Dental Society.

It was universally agreed that the C.O.P.A. have such representation, but the idea expressed did not seem to me to be fair.

This was, if the Ontario Society did not appoint a representative on the Committee, then, on the first meeting of the Committee, a representative should be appointed from the Canadian Oral Prophylactic Association by the Committee.

I believed then, as I believe now, that the Ontario Society should give the Canadian Oral Prophylactic Association the power to appoint its own representative on the Committee.

To overcome all these troubles, your Executive drafted a number of clauses which we suggested should be considered by the Ontario Dental Society, and it was favourably thought of by the Executive, was placed before the Society, and was defeated. The arguments used against it were entirely unfair and misleading.

The fact that the Canadian Oral Prophylactic Association have had to have a charter in order to protect its members individually against financial loss, was used by nearly every opponent of the measure to make out that we were a manufacturing affair or a commercial concern of some kind, and those who did not know anything about the actual facts of the case believed the statement. One man went so far as to say that it was handing over public dental education to Lyman Bros., the firm which we employ to make the tooth paste, and several said it was a scheme on the part of the Canadian Oral Prophylactic Association to control the public dental education of the Province, when, as a matter of fact, that was exactly what we were trying to get away from, and leave ourselves so that we could see that the moneys obtained from the sale of the products were used in the proper manner.

This defeat, of course, did interfere with both our work and our enthusiasm for a time. It seemed unreasonable to us that the Ontario Dental Society would not pass the measure giving us three representatives out of nine of an executive, and out of about 28 of a whole committee, then immediately afterwards appoint an Educational Committee having an executive of five, three members of which were C. O. P. A. members, and two of whom were among the most active members we have.

The only reason I can see for such action would be the erroneous impression which the society received of our incorporation.

Therefore, gentlemen, in order that the work, which we have been doing may not be interfered with, I believe we should give up our charter and in that way protect ourselves from being attacked by unscrupulous men, who for one reason or another, might wish to injure our Association or our cause. I have a proposition along these lines, which I will make to you later on in the evening.

During the past year, as you will see by our financial report, we have spent \$589.86 on educational work. As you know we have been the pioneers in all this public dental educational work, and we must do everything in our power to help it along, but we have got to know that any moneys contributed by us are used for that purpose. That is our only reason for existence, and that is sufficient reason, although we have been told more than once, that if we had done nothing else other than put the Hutax Tooth Brush on the market, we had justified our existence and placed the whole public and the dental profession under obligation to us.

During the year gone by, we have been asked for and have loaned charts seventeen times to different lecturers and societies. Slides also have been kept well in use. We have sent out a couple of thousand circulars to the profession.

Unfortunately we had to accept the resignation of one of our best members, Dr. Doherty, who has been honored during the past year by being appointed Dental Inspector for the public schools, as a consequence of which after a consultation with me, Dr. Doherty decided that in the interests of the work he should not be a member of the C. O. P. A.

Although I agree with him entirely, I must express my very sincere sorrow that such action was necessary on his part.

In April last, the Dental Society of Western Canada requested the Association to send Dr. Webster to Winnipeg to give a public lecture on Oral Hygiene.

This we were very pleased to do, and Dr. Webster reported a pleasant trip and a successful lecture.

The Hamilton Dental Society also requested that Dr. Webster deliver a public lecture there, which he did.

We had much pleasure in loaning to Dr. Thomson, of Nova Scotia, an exhibit on Oral Hygiene, which Dr. Thomson used in public lectures in Nova Scotia. We purchased this exhibit and have used it for lecturing purposes. It was used by Ontario Hygiene Exhibit at the National Exhibition last year, as were also some other charts which we possess.

Dr. Doherty, Dental Inspector of Public Schools, is making an unusually fine Oral Hygiene Exhibit, which we hope to be able to distribute free of charge to the different societies in the Dominion. This exhibit consists of about 30 cards, size about 22 x 26 inches, embracing a great deal of varied dental knowledge and covering quite a space in size. They are eminently suitable for teaching Oral Hygiene in schools, for assisting in giving public lectures, to go around with the Provincial Health Exhibit, or any such office.

We feel that Dr. Doherty is to be highly complimented for his energy and intelligence in getting up this exhibit, and the School Board should receive our thanks for giving us the privilege of making copies of Dr. Doherty's work.

Our business for the past year has been very satisfactory, and as you see by the financial statement is greater than it has been in any year so far, and we confidently hope that in the coming year it will continue to grow and prosper.

We have put on the market since our last meeting, the Hutax Lingual Brush, which is acknowledged to be far and away better than any brush invented for the same purpose. It as well as the other Hutax brushes are for sale by Hargreaves Bros.

The work which has been done during the past year has been borne equally by all of your executive. I wish to thank Dr. Web-

ster, Dr. Adams, Dr. Trotter, and Dr. Broughton for the unselfish manner which they have exhibited on every occasion, and their untiring energy in helping on the work.

**DENTISTRY IN THE HOSPITAL FOR SICK CHILDREN,
TORONTO, ONT.**



J. A. BOTHWELL, D.D.S., L.D.S.

Dental Surgeon to the Hospital for Sick Children, Toronto, Ont.

The installing of a clinic is by no means an easy task, and only those who have attempted the organization of a new department realize the amount of detail to be worked out.

One must consider, first, the class of work, in this case limited to the examination, treatment, and filling of teeth of children under thirteen years of age. Secondly, the amount of work to be done. The number of patients in the hospital at one time is about 130; the average number admitted per day being about 3. When one considers the length of time required to do one little operation in dentistry and the number of patients needing attention, one soon realizes the amount of work entailed in handling so many.

The equipment is of the most modern type, part of it being specially constructed for hospital purposes. The room is finished in light cream with equipment in white enamel. The engine was made specially to order of portable type, so that it may be used conveniently in the wards and at the same time be suitable for clinic work at the chair. This is accomplished by a compensating all-cord attachment, that allows the cable to be raised to the height of a man's head and lowered to that of a cot, without changing the belt. The controller has a handle and a means is provided on the motor-stand for conveniently carrying the engine from place to place. This is particularly necessary, for when you need an engine in the ward, you need it badly.



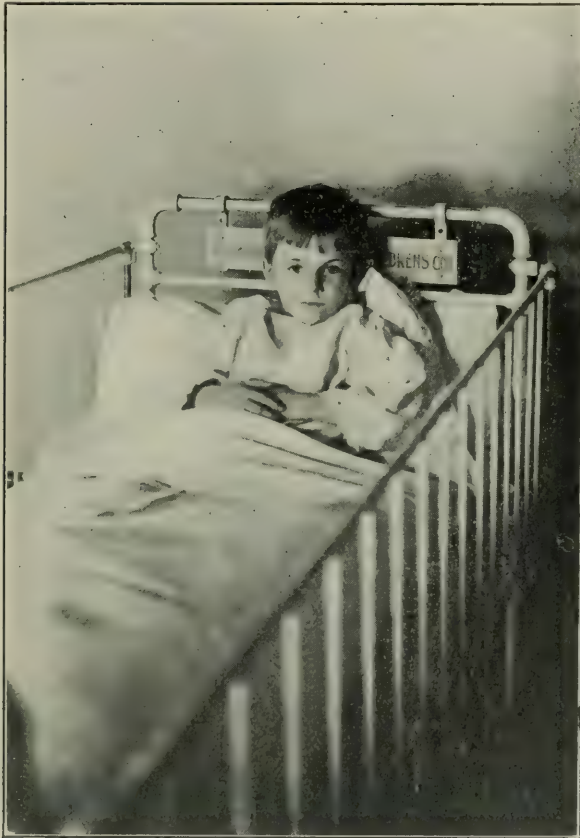
OPERATING ROOM.

The chair is very complete, and includes a child's seat and compensating back. All adjustments have automatic locks, so that each movement or change of position is accomplished quickly and securely. The back and head rest-slides respond immediately to the finger levers provided. The child's seat when not in use folds out of sight into the back. The upholstery is of green fancy hair-cloth, which is clean, durable, and of nice appearance.

I might mention here, for the benefit of anyone establishing a like clinic, that the cabinet, bracket, table, cuspidor, and operating

instruments were obtained at Claudius, Ash & Sons. The chair, engine, water heater, and sterilizer, of the Leighton Jackes Mfg. Co.'s make, were obtained from the National Refining Co. The accompanying cut is a particularly good one, showing everything in place except the sterilizer and water heater, which were placed in the cabinet in order to be in the picture.

When operating in the ward the side of the cot can be taken off or lowered to the floor, so that the operator may sit on the bed. The accompanying cut of the first patient to attend the clinic shows the style of cot with the side in its natural position.



THE FIRST PATIENT.

At the head of each cot, and attached to it by a double clamp, is a tooth-brush holder—one end of clamp is attached to the bed and the other to the holder. This holder is made of thin steel in two parts, a top and body—the top fitting over the body in the form of a sleeve. The holder is round with rounded ends, perforated so that air may freely pass through. The holders are tin on the inside and nickle on the outside to prevent rusting, and are made in this

DENTAL DEPARTMENT

Name.....

Case No.....

Examiner.....

Ward No.....

TEMPORARY TEETH	PERMANENT TEETH

manner so that they may be easily sterilized and have absolutely nothing to get out of order.

Each child on entering the hospital is examined and given a Hutax tooth-brush, which is kept in the holder on each child's own bed. The nurse has instructions to do the rest.

One of the greatest difficulties in organization was the arranging of the chart. As each patient must have a chart, and all do not need to visit the clinic, it was necessary to have an examination chart and a work chart combined. The left side is the working side,—under the head "Fillings," A and C represent amalgam and cement; under "Root Treatments," D is for dressing, T F for temporary filling; "Routine Treatment" refers to the instructions given to the nurses in lecture regarding the care of the mouth; "Special Treatment," when a mouth wash or anything special is required for the patient. The right side of chart is for the examination, marking of cavities, or of teeth for extraction. This chart may be improved on, but is being given a year's trial.

CAUSES OF PYORRHOEA ALVEOLARIS. INFLUENCE OF DENTAL OPERATIONS.

W. H. McDONALD, D.D.S., L.D.S., TORONTO, ONT.

Pyorrhea alveolaris is the term applied to that much dreaded disease of the gingival margin of the gum, which has caused the loss of so many otherwise healthy teeth. In a great many cases we have only the dentist's ignorance of the proper treatment to blame for the disastrous effect of this disease, but, of course, we have many instances of negligence on the part of the patient who has allowed it to proceed too far before applying for relief.

Pyorrhea usually makes its first appearance as a slight inflammation of the gingival border of the periodontal membrane. Soon the exudate may be noticed, which is followed by the formation of pus. The pus is contained in pus pockets, which become deeper as the diseased condition proceeds, until a great part of the root is exposed. The gum tissue is of a purple color and the blood flows quite readily upon pressure. As the inflammation approaches the root of the tooth, the tooth becomes quite loose in the socket, and it may be extracted quite easily without the aid of the forceps. In fact, one would think, from all appearances, that the slightest jar to the patient would cause them to fall out.

In the etiology of the condition the following statements may be safely made: Any irritant of whatever nature which impairs the integrity and continuity of the gingival gum margin may cause pyorrhea alveolaris, and without this impairment the condition will not be established. Systemic conditions or a constitutional diathesis without local irritation do not destroy the integrity of the gingival border. The degree of resistance to irritants differ

much in different individuals, in different races, and it also differs in the different climates. An irritant which will cause an inflammation and bring on an attack of pyorrhea in one case will be thrown off by another whose resistance is high for this particular organism. This may be said not only of the bacteria which causes pyorrhea, but of almost any form of bacteria; for example, the bacillus of tetanus is quite common in the ground and in various places, but how many of us ever suffer from lockjaw. We must come in contact with it quite frequently, but very few suffer from the dreadful lock-jaw. Pyorrhea may be either hereditary or acquired. By hereditary predisposition we mean that there is abnormal weakness of resistance transmitted from the father or the mother to the child. Pyorrhea is noticed by the leading men to often affect each member of a family and their children, and we must conclude from this that it is due to a weakness in the gingival tissue which is hereditary. We cannot say that this disease is always hereditary, for we have many examples of acquired pyorrhea. This may be due to lack of nourishment to the tissue of the gum, which has lowered the resistance to the irritant, and in doing so has made it an easy matter for the invasion of bacteria when the membrane is slightly injured by local irritation.

Salivary calculus is thought to be the cause of at least fifty per cent. of the cases of pyorrhea. The calcareous salts of the saliva are deposited upon the neck of the tooth, and, of course, a local irritation is set up. This deposit may occur to some extent in some individuals and not cause pyorrhea, while in others a smaller amount of it will produce a serious attack. There is also a form of gum recession which has no inflammation, and therefore cannot be termed pyorrhea. The gum is in a perfectly healthy condition, but has large deposits of calculus about the neck. Of course, this may through time lead to local irritation. Here the resistance must be high. One of the most common places of calcareous deposits is on the lingual of the lower anterior teeth, as it is quite difficult to reach this particular part with a tooth brush.

Mouth-breathing may also be considered a cause of pyorrhea. The gingival margin of the gum, particularly in the anterior part of the mouth, is dried by the air continually, and thus its function is interfered with. There is not proper nutrition to the membrane, and, of course, the resistance is considerably lowered. Slight local irritation may allow the organism to proceed.

Food may lodge in the interproximal spaces and around the gingival margins. Now, this material will become putrefactive, and the acid from it will cause considerable irritation. This, no doubt, will lead to an attack of pyorrhea, and great measures should be taken by the dental profession to prevent such occurrences. Thorough prophylactic proceedings should be strongly advocated, but, in addition to this, we must not forget that thorough mastication is one of the most important points regarding cleanli-

ness. Teeth coated with food form excellent growths for not only bacteria which produce diseases of the mouth, but for any form of organism. As the food is crushed down into the interproximal spaces, the pressure on the membrane alone will do harm to the tissues, and set up inflammation.

Another form of irritation is that of the dental ligature. The silk ligature, which is used in retaining the rubber dam, is often pushed far beneath the gum, and very often the tissue is injured in doing so. In the greater number of cases this heals up again, but when there is a hereditary weakness in the tissue, it is slow to heal, and bacteria enter, and soon a local inflammation may be seen, and if not properly cared for, it ends in a sure case of pyorrhea. In case of rubber ligatures, they always tend to roll towards the apex of the root; cases are known to have completely extracted the tooth after having caused a great deal of irritation. Great care should be taken in applying a ligature either for a rubber dam or for orthodontia, and the orthodontia ones are the most dangerous, as they are usually left on for a day or two, and the force of mastication may force them beneath the gum tissue. Constant irritation from one of these will certainly end in pyorrhea.

Poorly adapted crowns of either the shell or the porcelain variety are also a common cause of pyorrhea. The shell crown is considered the more dangerous because of its form of adaptation to the root. It is usually placed slightly beneath the gingival margin of the gum, and if it is not real well adapted, trouble is almost sure to follow. Any rough edge on the gold will cause inflammation to the membrane, and if allowed to remain such will doubtlessly end in pyorrhea. The edge of the gold should be smooth, and should be adapted as closely as possible to the root of the tooth before cementing. A porcelain crown has an advantage over a shell crown in its being adapted to the end of the root, and it usually has no band extending beneath the margin of the gum. But even this crown may cause local irritation if it is not properly adapted. The porcelain may extend over the margin of the root and imbed itself in the gum, thus causing a local irritation, and eventually disastrous results will be seen. Again, the food may collect beneath this ledge of porcelain and become putrefactive and aid in the attack of pyorrhea, which is certain to follow if not relieved.

Some of our nice large amalgam fillings, which involve the proximal wall, may well be considered common causes of pyorrhea. It is difficult sometimes to avoid having a sharp edge of amalgam at the gingival border on account of the concave shape of some of the teeth at that point. A matrix may be applied with the greatest of care and wedged with all care, and yet there will be a space left through which the amalgam will be squeezed. The filling on becoming hard may so irritate the gum that after continued irritation the exudate appears, and finally pus pockets of pyorrhea are present. These fillings should be well trimmed, particularly at this

point, while in a plastic condition. The wedge which is used in retaining the matrix or in separation of the teeth for filling, is also worth watching. The interproximal spaces, as we all know, are wider as they approach the apex, and naturally the wedge will be forced toward the place of least resistance. The tissues will be torn and a local irritation is the result, and form an easy place of invasion for bacteria. Some of our patented separators may also prove themselves as irritants for the same reason. Avoid using a separator which will reach the periodontal membrane if it is at all possible to do so.

Ill-fitting partial dentures also attribute a common cause of pyorrhea. There is usually an irritation from any form of denture, but, of course, it is only the partial one which will cause this disease, for where there are no teeth there is no pyorrhea. If it be a vulcanite denture entirely there is always a portion of the vulcanite lying against the gingival margin of the gum tissue. Here it lies from day to day, and of course very often sets up a slight chronic irritation. The margin is inflamed and painful, and then turns purple. The exudate is then seen, and as usual pus pockets form. Food and calcareous deposits also lodge here if the denture and teeth are not properly cleaned and putrefaction takes place and cause destruction of the tissue. This condition is quite common in case of a lower partial where we have the anterior natural teeth in position. Our bar lower denture assists in getting away from this trouble, but even with these there may be a slight irritation at the distal margin of the last natural tooth.

Mal-occlusion is also productive of pyorrhea. It is impossible to keep all the teeth clean, even with a tooth brush. There are always some surfaces which will not be reached by the brush. The food lodges around these teeth and becomes acidous and irritates the membrane. The gums are not exercised, and, therefore, are less resistant to bacteria.

Proceedings of Dental Societies

MANITOBA DENTAL ASSOCIATION.

PRESIDENT'S ADDRESS.

G. F. BUSH, D.D.S., L.D.S., WINNIPEG, MAN.

Winnipeg, Man., January 8th, 1912.

Fellow Members of the Manitoba Dental Association:

Once more we are gathered together to hear and discuss the reports of the several officers of this Association, and, honestly, gentlemen, in coming before you for a third time with the President's address, I realize that I have perhaps occupied the position of Chief Officer for too long a period. I thank you for continued confidence which this bespeaks, and can only say that I have tried to do my duty.

From the Secretary's Report, you will see that our numbers are being increased in this Province very rapidly. In the name of this Association I extend these newcomers a hearty welcome, and trust that they will feel they are co-workers with us, and do all in their power to advance the Dental profession in this part of the world.

The hand of death has been laid upon three Charter members of this Association during the past term, Doctors R. W. Stark, M. C. Clarke, and W. E. Emmons. Dr. Stark was a well-known dentist in the earlier days, and was a genial and optimistic man. Dr. Clarke was not only widely known as a sportsman, but also took a lively interest in the formation of this Association and was at one time an officer of the Board. Dr. Emmons, perhaps in his day the most widely known dental practitioner in Manitoba, removed some years ago to Vancouver on account of failing health; his early death came as a shock to his many friends here.

During the past term, the Winnipeg Odontographic Society has sprung into existence. It is open to all ethical practitioners in the city, and all should belong and take an active interest in it; we wish it continued success.

It is with much pleasure I inform you that the establishment of a Free Dental Clinic in connection with the Outdoor Department of the General Hospital is now practically an accomplished fact, only waiting for a few minor details to be in full swing. I am fully aware that the proper person to pay for dental services is the party benefitted by the same, and in default of that, the City or State; but the stern fact faces us that unfortunates are suffering for want of simple dental service, and who is so well able to render that charitable service as we whose skill and training fits us to do so. I feel certain that this movement will quickly lead to a permanent appointment on the Hospital Staff, and let me urge on

our successors in office that they keep that appointment as much under control of the Board as possible. For the person appointed would of necessity have to be a licentiate of this Province, and while most likely some young graduate of one of our Canadian colleges will be chosen, it would, in my opinion, be better for all concerned if the negotiations in the appointment came through the Manitoba Dental Association.

The Board has seen fit to make considerable alterations and additions to our by-laws; they come up for ratification to-night.

I note with regret that Drs. K. C. Campbell and C. H. Walsh have decided not to offer themselves for re-election. I have been closely associated with these two men in the work of the Board for six years, and can safely say that their one aim has been to do that which was best for the profession.

In conclusion, my friends, let me thank you for the ready support you have always given the Board and myself on any occasion it was required. I still have two years to serve as a member of your Board, and as such without portfolio, I hope to be of some service. And as far as the future is concerned, I shall ever be ready to lend a helping hand and support the officers of this Association and will continue to do my best to advance the interest of the Dental profession in this our Province of Manitoba.

SECRETARY'S REPORT.

Winnipeg, January 8th, 1912.

Mr. President, Officers, and Members of the Manitoba Dental Association:

GENTLEMEN,—In presenting to you my report covering the work of the Association for the two past years, I wish to express to you my sincere appreciation of the confidence you placed in me in electing me to the position and of the helpfulness you have shown me from time to time during my term of office as Secretary.

Progress has been made by the profession the last two years. We are getting stronger each year in point of numbers, and the profession is holding firmly together. Of the good work done by the Dental Society of Western Canada and also the Odontographic Society of the City of Winnipeg, I cannot speak too highly. No one will question the uplifting influence of these two organizations.

Pressure has been brought to bear upon us to do something for the poor of the city in the way of dental assistance at the outdoor clinic at the Winnipeg General Hospital. At a meeting of the Dentists of Winnipeg, the Board was authorized to appoint a committee to take up the question and to handle it as they thought best. A Committee appointed interview the Hospital authorities and as a result a small space is being allowed and an outfit ordered to facilitate the work.

The question of becoming a faculty of the University is left in abeyance for the present. It would be well if a good discussion of this important question would take place at this general meeting.

During the years 1910 and 1911 there have been thirteen names added to the list of licentiates of the Province, of which number six have been indentured students and seven were admitted on presenting their Dominion Dental Council Certificates and paying the required fee.

There were seventeen students added to the students' roll in the last two years. Quite a number of prospective students have made enquiries recently as to the requirements for the study of Dentistry.

Some 183 letters have been received in 1910 and 1911, and 218 copies of outgoing letters are on file in the Secretary's Office.

There were four regular meetings of the Board, as called for by the Act and also one special meeting. Besides these, the Committee of the three members residing in Winnipeg, appointed by the Board, to handle routine matters, have met many times during the past two years.

It has been thought fit to make some changes in our By-laws, to put them on a more fair and equitable basis. These will be placed before you at this meeting.

My term of office as Secretary and also as a member of the Board expires this evening. I would again thank you for the honor you have done me in the past, and further, would ask you to show the same kind courtesy to the new Secretary as has ever been shown me during my term of office.

All of which is respectfully submitted.

K. C. CAMPBELL, Secretary.

TREASURER'S REPORT.

Mr. President and Members of the Manitoba Dental Association:

It gives me pleasure to present to you the Treasurer's Report on the two past years.

The by-law reads: "It shall be the duty of the Treasurer to hold all funds of the Board; to pay all orders drawn on him signed by the President and the Secretary; to keep a true record of all moneys received and expended by him; to give a report to the Board at every regular meeting upon the state of finances, and to deliver to his successor in office all books, papers and other property belonging to the Board that may be in his possession."

All of which, gentlemen, I have endeavored to carry out satisfactorily. The books, etc., have been duly audited by a chartered accountant, who certifies them correct.

I beg to submit the following statement, showing the state of finances of the Association up to date.

(Signed) J. M. ROGERS, Treasurer.

REGISTRAR'S REPORT.

Souris, Manitoba, January 8th, 1912.

To the President and Members of the Manitoba Dental Association:

GENTLEMEN,—As Registrar of the Manitoba Dental Association, I beg to make the following report for the past two years:

There are on the roll of Licentiates at present 99 names. Of this number 84 are practicing in the Province; 6 new names being added in 1910 and 7 added in 1911.

During the past two years fees and arrearages to the amount of \$332.85 have been paid in to me and handed over to the Treasurer. There are at the present 34 members in arrears to the extent of \$184.00.

Fraternally yours,

H. A. CROLL, Registrar.

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Term ending January, 1914:

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Dominion Dental Journal

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TORONTO, MARCH 15, 1912

No. 3

CANADIAN AND ONTARIO DENTAL ASSOCIATION.

HAMILTON, JUNE 3, 4, 5, 6, 1912.

Canada's two largest and most influential dental organizations combined will meet at Hotel Brant, Burlington, a suburb of Hamilton, Ontario, June 3, 4, 5, and 6, 1912. During the closing session of the 1910 meeting of the Canadian Dental Association there seemed to be a desire to again meet with the Ontario Dental Society. Niagara Falls was suggested as a suitable meeting-place, but on further consideration it was thought unwise to meet anywhere that there was not a large number of local dentists to look after the many local requirements for so large a meeting. Hamilton was suggested by some one who knew the enthusiasm of the Hamilton Dental Society. It was a happy thought, because every element to make such a meeting a success is present.

The local dentists are energetic, resourceful, and enthusiastic. It was an opportunity to have a meeting of the Ontario Dental Society outside of Toronto. There is a first-class railway service

from every point in Canada. Pleasant weather comes to Hamilton at least two weeks earlier than to any other large city in Eastern Canada. There is the largest dental population in Canada within a radius of fifty miles of Hamilton.

Besides these general considerations, the local conditions are ideal. The meetings will be held in a superb assembly room in the hotel. It is so located that there will be no distracting noises; there



HOTEL BRANT, BURLINGTON

will be good light and good acoustics. The hotel will accommodate almost all the guests. The rates are moderate. There is ample accommodation in near-by hotels in Burlington or in Hamilton, beautifully situated on Burlington Bay, and surrounded with every opportunity for enjoying spare moments. Bowling greens, tennis courts, baseball diamonds, and golf links surround the hotel. The hotel is noted for its fine cuisine; there are spacious dining rooms and verandas overlooking the lawn and Lake Ontario. The accommodation for clinics and dental exhibits could not be better. Could any place be more suited for combining the business of studying dentistry with a holiday? There will be no other guests at the hotel; just dentistry for a week! What an opportunity to talk, consult, compare, record, and make new resolutions! Bring your wife and arrive on the Saturday before the meeting.

The local committee will see that members who arrive in Hamilton by train will be sent out to the hotel by car without delay. Those arriving from the East may leave the train at Burlington Station and save going into the city and out again. Arrangements are made with the railway companies for reduced rates by the certificate plan. Those attending the Dental Society of Western

Canada will have their certificates extended so they may attend both meetings.

The programme is the best yet. Thomas B. Hartzell, Minneapolis; G. H. Logan and Hart. J. Goslee, Chicago; George Grieve, Toronto; C. A. Murray, Moncton; J. O'Neil, Fort William, and others will supply the programme. Reports of progress in educational work from various provinces will fill one evening session. There will be upwards of seventy-five clinics on every aspect of



modern dentistry. The exhibits of dental supplies will be the largest and most varied ever shown at a dental convention in Canada. Look for a full programme April first.

The President, Dr. W. D. Cowan, Regina, will spend a month in Hamilton previous to the meeting so as to be sure that every detail will be ready.

The Dominion Dental Council will hold its bi-annual meeting during the convention.

There are few dentists who can afford to miss such a week of dental education and dental sociability. Hamilton, June 3, 4, 5, 6, 1912. *Going?* Yes!

DR. TAGGART WINS HIS SUIT.

Dr. Taggart holds patents on the cast gold inlay process in the United States. He brought suit against Dr. George W. Boynton, of Washington, D.C., to restrain him from using the casting method in his practise. Dr. Boynton was using a centrifugal machine. It is the making of molds for dental inlays that is patented not the

machine. Many Canadian dentists are anxious to know how this decision may affect them. No such action can be brought in Canada because there is no such patent here. And if there had been it would have been voided by now, because manufacturing under the patent must begin within one year of its issuance.

In the Supreme Court of the District of Columbia. William H. Taggart vs. George W. Boynton. In Equity, No. 27927.

DECREE.

This cause having come on to be heard on the pleadings and proofs, and the court having heard the argument of Russell Wiles, Esq., and Francis M. Phelps, Esq., on behalf of the plaintiff, and of E. T. Fenwick, Esq., on behalf of the defendant and being fully advised in the premises, finds as follows:

1. William H. Taggart, the plaintiff herein, is the owner of Letters Patent of the United States, No. 872,978, for a method for making molds for dental inlays and the like.

2. Said Taggart was the first, sole and original inventor of said method and said method involves patentable invention over the prior art. It was not known or used by others before plaintiff's invention thereof or more than two years prior to Jan. 12, 1907, and the defenses of prior knowledge and use, and of public use more than two years before the filing of the application are not established and are overruled.

3. Letters Patent of the United States, No. 872,978, are therefore good and valid in law as to each claim thereof.

4. Defendant, Dr. Geo. W. Boynton, has infringed said patent by practicing the process thereof in the District of Columbia since the grant of the patent and prior to the filing of the bill herein.

5. Plaintiff has not prayed for damages in his bill and has limited his prayer to that for an injunction and general relief.

It is therefore ordered, adjudged and decreed that defendant, George W. Boynton, his agents, servants, attorneys and workmen be and hereby are enjoined from further infringing said patent and from further practicing the method thereof, and that a writ of injunction to this effect issue out of this court.

Further ordered that defendant pay the costs of this suit to be taxed by the clerk and plaintiff have execution therefor.

HARRY M. CLABAUGH,
Chief Justice.

Approved as to form,
Francis M. Phelps,
Dyrenforth, Lee, Chritton & Wiles,
of Counsel for Plaintiff.
Edward T. Fenwick,
of Counsel for Defendant.

Editorial Notes

Dr. T. B. Hill, Calgary, has located in his new offices.

Dr. Madill, R.C.D.S., 1911, has opened an office in Toronto.

Dr. Duff, Portage La Prairie, has moved into his new office.

Dr. E. L. Thompson, R.C.D.S., 1909, is now in Eburne, B.C.

Dr. Devitt's office, Bowmanville, was recently damaged by fire.

Dr. Garvin, Winnipeg, has returned from a trip to the West Indies.

Drs. Frear, Copeland and Brownlee, were recent visitors at the R.C.D.S.

There are thirty public dental surgeons for school children in Sweden.

Dr. Hugh McLaren, one of the pioneers of dentistry, recently died in Toronto.

Dr. F. E. Bennett, St. Thomas, has given several lectures on the teeth in St. Thomas.

Dr. W. J. Bruce, Kincardine, has resumed practice after a long illness from an accident last autumn.

Passengers on many of the trans-atlantic steamers may have their dental needs attended by the ship's dentist.

Laval University is now preparing plans for a new dental college building to accommodate two hundred students.

The Hya Yaka Club of the Royal College of Dental Surgeons, held a dance in the Temple building, February 19, 1912.

A free dental clinic has been opened in Winnipeg General Hospital where patients will be treated on Tuesdays and Fridays. The local dentists will take turns and arrange their own schedule.

The British Columbia Colonist is advocating the appointment of a dentist to take care of the teeth of the poor of Victoria.

Dr. J. E. Lalamac, Montreal, succeeded in preventing a fire in a private house which he noticed beginning as he was on his way home from a sleighing party.

The Board of School Trustees, Moncton, N.B., has given permission to the members of the local dental Society to examine the teeth of the pupils of the Public and High Schools. Also to deliver lectures on the care of the mouth and teeth.

DENTAL INSPECTION AT GODERICH.

The dental inspection of the school children in Goderich, which is being done by the three local dentists under the direction of the public school board, indicates that at least ninety-five per cent. of the younger children do not receive proper attention in this respect. As the children grow older the inspection shows that better conditions prevail. The method followed by the dentists is to fill in a form to be handed to the parents, showing the number of temporary or permanent teeth needing treatment and the number of teeth that should be extracted.

NERVES IN DENTINE.

On Thursday, February 1, Mr. Howard Mummery read before the Royal Society his long-expected pronouncement upon the nervous distribution in dentine. After years of patient research, he has finely and conclusively demonstrated the existence of nerve fibrils in the tissue. It is proved by hundreds of sections and dozens of different staining methods, and must now pass into current teaching. The effect of the discovery clears up many incongruities and once more brings our anatomy into line with common sense and the natural order of histology throughout the body. Mr. Mummery has added to our debt of gratitude towards him, a debt already large.

Proceedings of Dental Societies

MIDDLESEX DENTAL SOCIETY.

A meeting was called by Dr. Ross Thomas, London, Ontario, and an organization known as the Middlesex Dental Society was formed. The following officers were elected: Honorary President, Dr. McDonald; President, Dr. A.E. Santo; Vice-President, Dr. Ross Thomas; Secretary-Treasurer, Dr. Moore; Entertainment Committee, Dr. H. R. Abbott and Dr. Colon Smith; Press Correspondent, Dr. Lloyd Moffatt.

The Canadian Oral Prophylactic Association has all the necessary equipment for giving public lectures, and will gladly send them to anyone needing them free of charge. Write the secretary for models, charts, lantern slides, etc., and he will pay all expenses. Any dental society wishing to undertake an educational campaign will be supplied both equipment and funds to carry it on. Address A.J. Broughton, 305 Markham Street.

BRITISH COLUMBIA DENTISTS MEET.

A general meeting of the College of Dental Surgeons of B.C. was held at the Hotel Vancouver, Vancouver, recently, members from throughout the Province being present. The President, Dr. J.M. McLaren, presided, and in the course of his address, outlined the work accomplished by the Council during past year. The report of the registrar-treasurer, Dr. H.T. Minogue, was presented, fully discussed and adopted. Action was taken in regard to several matters of import to the profession which came up for consideration. It was decided to hold the next annual meeting in February, 1913, in conjunction with which a number of clinics and demonstrations will be given. A strong committee was appointed to arrange necessary details. Subsequently, the Vancouver Dental Society held its annual banquet in the hotel, and had as guests the visiting practitioners from outside the city, the affair proving a great success in every way. Dr. A. Brighthouse, the president of the Society, acted as toastmaster, and very capably filled the role. The toast list was well chosen and duly honored. Those who spoke

were Drs. Bridgman, Wark, McLaren, G.A. McGuire, M. P. P., Smith, (New Westminster), Jones, Minogue, Curry, Ansley, (Victoria), Harper (Victoria), Harvey, (Kamloops), and many others.

ANNUAL MEETING OF THE N. J. STATE DENTAL SOCIETY, JULY 17, 18 AND 19, 1912.

The committee in charge announce with pleasure that contracts have been signed for the Forty-second Annual Convention of the New Jersey State Dental Society, to be held in the new and magnificent one million dollar fireproof "Hotel Cape May," Cape May, N. J.

This hotel is situated on the extreme lower corner of the New Jersey Coast, swept by the Atlantic Ocean and Delaware Bay, with miles of board walk, a sloping, hard firm beach that will accommodate six autos travelling abreast, fine bath houses and garages; the hotel has broad corridors, is thoroughly fireproof, one hundred and fifty baths, with hot and cold sea water, and is unsurpassed for elegance, comfort and cuisine; its facilities for meeting room are perfect, fine light for clinics, and the space the dental and medical exhibitions is in abundance. A direct current, electric light plant is run by the hotel, and the city power is the alternating; every inducement and space will be given exhibitors. Lithographed floor plans can be obtained from the Chairman of the Exhibit Committee, Dr. Moore Stevens, of 1503 Pacific Avenue, Atlantic City, to whom application for space can be made.

The Chairman of the Clinic Committee, Dr. M. R. Brinkman, of Hackensack, already has quite a number of prominent men booked, and will try to make room for all who desire to give chair or table clinics.

The Chairman of the Essay Committee, Dr. Wentworth Holmes, 472 Broad Street, Newark, N.J., has secured from five well-known men papers of great interest, and expects others.

The hotel rates will be American plan—\$3.50 per day each for two persons in a

room, \$1.00 per day, one person in a room. The majority of rooms have twin beds. Other hotel rates in May.

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land-lock harbor has at present a depth of forty feet. Negotiations are under way to bring the public by the all water route from New York, Boston, Philadelphia, Baltimore, Washington and other cities.

CHARLES A. MEEKER, D.D.S.,

Secretary.

Reviews

ANATOMY. A Manual for Students and Practitioners. By John F. Little, M. D., of the Jefferson Medical College, Philadelphia. New (2d) edition, enlarged and thoroughly revised. 12 mo, 491 pages, with 75 engravings. Double number. Cloth, \$1.50, net. The Medical Epitome Series. Lea & Febiger, Publishers, Philadelphia and New York, 1911. L

That this work has fulfilled the purpose for which it was designed is shown by the demand, which has exhausted several printings of the first edition, and has now led to the call for a revision, in which it has been brought thoroughly up-to-date and improved in many ways. The present revision has been placed in the hands of Dr. John F. Little, of the Jefferson Medical College, Philadelphia. This arrangement is an admirable one, for not only is the author well equipped for his task, but he has also availed himself of the valuable suggestions of Professor E.A. Spitzka, one of the foremost anatomists of this country. The volume, therefore, should be of the utmost assistance to students for purposes of quizzing, and to physicians and surgeons for refreshing their memory on anatomical points.

A MANUAL OF DENTAL PROSTHETICS by George Henry Wilson, D.D.S., formerly Professor and Demonstrator of Prosthetics and Metallurgy in the Dental Department of Western Reserve University, Cleveland, Ohio. Illustrated with 396 engravings. Lea & Febiger, Philadelphia and New York, 1911.

At the present time there is really only one book on prosthetic dentistry suitable to place in the dental student's hands for study during his college course. In the past most works upon this subject were too large for students' use. The author, Dr. George Henry Wilson, has for a great number of years been a teacher of prosthetic dentistry, and during more recent years devoted all his time to his practice. The work is designed to apply the most recent scientific advances in the subject to the practice. Anatomical Articulation of the teeth receives thorough consideration, as does also the more recent methods of adapting partial dentures. Many improvements have been made in the practice of prosthetic dentistry during the past few years. Dr. Wilson has done well in not writing a book of several hundreds of pages. He has covered the subject in less space than most of his predecessors.

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No. 4

Original Communications

AFTER TREATMENT OF GINGIVITIS.

THOMAS B. HARTZEIL, M.D., D.D.S., MINNEAPOLIS.

Delivered before the Dental Society of Western Canada, April, 1911

I hope, gentlemen, you will pardon me for the purely informal way I am going to get at what I have planned to present to you this afternoon, but I felt after doing the clinic this morning and answering quite a good many questions regarding the philosophy of the treatment that I was endeavoring to give a patient for destructive inflammation that existed around the roots of those teeth that I would like to support what I had said yesterday by a little further talk, probably ten or fifteen minutes, regarding that treatment which I then gave, and the general philosophy of the after treatment for that class of cases.

STIMULATING AND HARDENING THE GUMS.

In this particular case, this morning, the bone was destroyed between the two central lower incisors for a depth of about one quarter of an inch and on the sides of those roots was an accumulation of serumal calculus, which, at first, prevented passing the instruments between the roots. After carefully planing those roots I found I could present to view an absolutely pearly, gleaming surface. Now, in this particular case, I feel confident that there will be an outpour of granulation tissues into that crevice between those roots, and that in three or four days' time that crevice will be filled to the level of the labial gum and that in probably ten days' time there will be a new mucous membrane bridging across from the labial to the lingual gum. I asked the physician who had this case in charge to make sure that he use évery influence to have this patient use heavy massage on these swollen gums. These gums are thickened so that they are at least one-eighth of an inch greater in transverse measurement than they ought to be. Now that the bacterial infection or culture bed which has continuously irritated those tissues has been removed the proper thing to do is to regain

normal circulation as rapidly as possible to induce those gums to thin down and feather out, if I may use that expression, and to do that I use a tooth-brush which has been cut rounding so that it will roll, without corners so that it will not tear the mucous membrane, and I should like to have this patient, in time, use 15 or 20 pounds of force on that tissue. Always remember that that mucous membrane is practically the same as the palm of the hands, both are pavement epithelium. Of course, the palm of the hand is dry, but in the mouth the epithelium is capable of being thickened, toughened, made to grow more dense and elastic, and if you can get that gum to become dense so that it will not bleed on pressure you have practically put it in such condition that you will not have a recurrence of inflammation in it, and I think perhaps the amount of force that one can use on one's gums would be a revelation to you if you had never tried it, or had never seen a test made, so I plan just to take a tooth-brush and give you a demonstration of the way I would have that patient treat his gums himself after he had had the treatment of the whole mouth completed by the dentist. I would not advise the application of an astringent, stimulating massage treatment until the whole mouth had been treated, because you will cause the other gums, if you apply it to the whole mouth, to commence to shrink and make it more difficult to finish the surgical treatment. but as soon as you have completed the surgical treatment of the root surfaces then the patient should have some good, stimulating astringent. It doesn't matter a great deal what it is. You might content yourself with pure water, as Dr. Webster said yesterday, but if you wish to hurry the hardening combine alcohol in the proportion of at least one-third the bulk of whatever you may use. I am using here a decoction of red oak bark, alcohol and glycerine, about one-third of each,* and I have the patient pour it out in the palm of the hand and set the bristles of the brush in it, so that the bristles are filled up with the stimulating astringent. The alcohol will dissolve all the oily matter around the teeth. It is cleansing stimulating and antiseptic, and the tannin in the oak bark seems to be helpful. Now you might use that for a time and find that the gum would cease to respond to it in a satisfactory way; then it would be advisable to change to something else, say, zinc sulphide carbolate, 10 per cent. in cinnamon water. That is a very inexpensive and effective astringent, but recollect that you must not use these astringents to extremes because you alter the secretion of the mucous membrane if you do.

BRUSHING AND BRUSHES.

Regarding the amount of force to use, I am going to ask my friend in the front row to grasp my wrist and prevent me from doing this. (Illustrates.) Now there isn't a bit of blood on that brush, and I go all over the mouth that way with a short brush with the bunches of bristles set wide apart; a small brush, so you can apply force with and get it into all the sinuosities of the process

and a brush, the bristles of which will fall into the crevices between the teeth and scrub them clean; and, applying force to the interproximate gum because that wedge of gum fails to get as much stimulation as the convex areas, and the result is that the interproximate gum will stay blue when the convex areas will become hard and pink.

In directing your patients to do this I think it is a very good plan for them to bring their brushes to you to the office, and if they are square and big take your pen-knife and cut off four or five rows of bristles from the heel of the brush and take your scissors and trim the remaining tufts round, so that they can get this rotary movement without having a corner that will tear off the mucous membrane. Then have them do the operation of massaging the gum and cleansing the teeth in your presence to see whether or not they get at all the dental surfaces because you will find many cases of failure, I am sure. I have found it so, where the patient will have the surface of one-half the teeth or one side beautifully clean and the other side very filthy, and they will think they are doing a splendid operation and pat themselves on the back and tell you how well they are doing it, when in fact the mouth may be unclean. So, if you find an area that isn't properly massaged, point that out to them and show them just how to get at it. Almost all of them fail to get at the lingual surfaces of the lower molars, and I have just a simple practice of taking the brush and illustrating to the patient. Sometimes I drop down on one knee, so the patient sitting in the chair may see just where I put the bristles of the brush, and I am going to do that for you, because if you haven't thought of it it may be helpful to you, and if you have you will forgive me for doing it. For the patients' left side put the thumb on top of the handle and set the bristles of the brush right down on the floor of the mouth, and simply turn the wrist. For the right side of the mouth insist on having the thumb *underneath* the handle, and it is simply a bending of the wrist. Be sure that the patient pushes the brush far enough back; so that he gets the lingual surfaces of the three molars, because a lot of them will only sweep the surfaces that the brush will touch, and I think those little short brushes Dr. Webster showed us would be very valuable in that connection. I haven't had any special brushes and I say to the patient, "Get the sort of brush I have described, take your scissors and trim it or your penknife, until you can use it in the manner indicated. Those Hutax brushes shown on the screen last night pleased me very much indeed. Now to get the lingual surface of the lower anterior teeth is something of a trick, and just one thought regarding that and I will stand so that you will see just how I do it. Let the thumb rest against the lip and project the brush into the mouth and you get the very firmest, most vigorous contact with the bristles on these lingual surfaces, and the same thing is true of the upper. You can make the chin the fulcrum for the upper and you get a leverage

of five or ten pounds upon the gums and the heavy, vigorous rubbing that stimulates the growth in the mucous membrane and makes it tough, and I assure you that if you have a mouth that has previously had any inflammation and you will cause these gums to grow tough and resistant and elastic, you will not have bone dissolving, barring one thing; the convex areas, if stimulated too much, can be made to set up what some, in times past, have called senile absorption, because we do not give it thought enough to realize that the absorption of the delicate thin process of the convex areas of the cuspid region had been actually caused by cross motion of the brush. You wish to avoid that with all your patients. Don't let them use much cross motion on the gums because that cross motion will over-stimulate the circulation sufficiently to cause it to break down the thin overlying bone in the convex areas while the motion that takes the brush from the root end toward the occlusal surface will never do that.

Now, perhaps you will think I am spending too much time in trying to demonstrate exactly how to do this thing. Because it is so simple some of us haven't given it thought, and as a result we have not compelled or induced our patients to give it the thought necessary, and it is just this attention to the minute details of prophylaxis that makes the difference between success and failure in practice. You may understand it perfectly, but if you do not convey your ideas accurately to the patient you will fail, but if you do and induce them to do the thing that you wish, you will be rewarded with a meed of success that will simply surprise you. For when I commenced to do this thing I really was much more surprised than perhaps you will be, because you have been forewarned and I wasn't.

SUPPORTING LOOSE TEETH.

Now, then, that disposes of that phase of the thought I wish to leave in your minds, and I will take up another phase of the after-treatment or supportive-treatment of this work. Many of these teeth are loose, not because the bone has been dissolved, but because the fibrous attachment is swollen, the sockets being conical, the swelling holds the tooth up. Now if there is plenty of bone left, after your treatment has had time to bestow its beneficial effect on the surrounding tissues, the tooth sinks back in the socket and it is comparatively solid, which is a result that the patient will see and talk about, and he will feel grateful to you, but there is the other class of cases, where the bone is actually dissolved, and even though the inflammation vanishes from the surrounding tissues there isn't enough bone there to hold those teeth steady. In other words the leverage is greater than the anchorage. How are you going to overcome this? Are you going to condemn them and extract them. *Certainly*, unless you intend to compensate for the bone that has been lost. If you compensate for the bone that has been lost and render those teeth stable they will take the down stress for maybe

a lifetime, *provided* the patient *will keep* the mouth in a *hygienic condition*, the roots that are exposed gleaming and white, and as aseptic as a mouth can reasonably be. Now, in order to gain that support and to compensate for the loss of bone we have practised a variety of schemes. A number of them you perhaps are perfectly familiar with, viz., the making of splints and cementing those splints to these teeth. Now, the making of the fixed splint has some very grave objections, viz., that occasionally one of those teeth will have a recurrence and it will begin to spring and its membrane swell and heave up, and it will break the splint loose. Then you are up against the proposition of remodelling the whole splint, tearing it down, maybe knocking to pieces \$50 or \$100 worth of work just to regain control of that one tooth; and men have been trying to find a way to make these splints absolutely solid, bring the teeth together so that they will give mutual support to each other and still be able to remove the splint at will, that it may be kept clean.

I will illustrate how this may be accomplished if you do not mind my taking the time from the topic that was otherwise assigned to me. The first plan is to devitalize those teeth, and I find the most rapid and successful way is the method used for Dr. Bowles this morning, gaining anesthesia by forcing the anesthetic through the dentin. Take out the pulps, cut the teeth off at the gum level. Make for each one of those teeth a cope and pin just as you would make for the Richmond Crown. Now, if the teeth on both sides of the lower arch are loose and wobbling, and there isn't bone enough to give them support and you want to keep them and get the most advantage from their mutual yoking together, cope all of them. Do not be worried because the roots may not be parallel, you don't need to strive to make these copes so that they will all slip off in the impression. When you have made these copes and you have put them on the teeth you take a plaster impression, and when the impression is hard you take off each of these copes and place them in the impression and flow it; you reproduce a model of the jaw with the copes in position. Now your next step will be one of two plans, and I will detail both of them very briefly. One is to put a platinum post on every one of these copes a little to the lingual of the center of the cope, and when you put the posts on these copes you can hold the cast up and sight every time until you have them all in line. The cope may lean a little, but the posts must all be parallel. Now you can make dummies that will fit down over these posts and unite the dummies in a bridge for the two sides respectively, and then connect the two sides by a round bar of metal, so placed as not to annoy the tongue, and if you want to have that piece of bridge work removable and at the same time so that the patient can take it off, you can lock it on by a key-shaped slide (see illustration), which patient can easily remove.

Now, suppose an inflammation happens to one of these teeth and you want to treat it, or the gums of the teeth, not having a great

deal of bony support about them, becomes infected and heaves up and one of these copes breaks loose, you just take off the piece of work, re-cement the loose cope and put it back on and you haven't lost anything and the patient hasn't either, because you have not torn down \$100, \$200 or \$300 worth of fixed work. This plan simply takes advantage of set screws on the side or end to lock removable bridge work to cemented copes so you can lift it off at will. We have a good many cases in use now and they are affording me a great deal of satisfaction.

Now, then, the advantage of these methods are that you get the mutual support of a great group of teeth, and in such a way that you can readily remove the work and treat them in case there is any recurring inflammation arises from some other cause than strictly pyorrhea infection or even a recurrence of pyorrhea infection.

Now, you can use these cross bar braces in the upper mouth and put on exactly that style of bridge work and yoke the two sides of the upper arch together just as readily as you can the lower, provided you put the connecting bar a little back of the position of the second molars. You all recollect that in aspiration and in speaking our tongues do not touch our palates unless we consciously endeavor to do it, and you can bring these cross bar braces across the upper arch just as readily as you can the lower arch, and I have cases in which the teeth were very loose and which, ten years ago, I certainly would have condemned and taken out, every one of them carrying that kind of work successfully to-day and affording great satisfaction to the patient.

Now, I do not say to you gentlemen that these teeth are just as good as though they had never been attacked, but where patients can afford to pay for that kind of work you certainly can keep their natural dental organs in position and give them the advantage of those teeth for many years where otherwise they would be sacrificed. And it has one other advantage, a patient who is willing to spend the time and the money to have that sort of a piece of work put in position values it enough to give it the very best of care, and that is one way of educating them to take care of them.

The square block attachment was perfected by Dr. Corcoran of St. Paul, Minn., and can be had of him. The side screw method of retaining the bridges is not patented.

POLISHING THE SURFACES OF THE TEETH.

Now, then, for people whose teeth are in sufficiently good condition that they need no splinting. I endeavor to have each patient come back to me sufficiently often to know that he is keeping his mouth in as good a hygienic condition as one has any right to expect a patient to keep his mouth. Maybe that is once every three months; maybe it is once every six months; maybe it is once every month. I have a good many patients—pardon me for using this

word "I"; I cannot help it in this connection, because I am trying to give you a chapter out of my own experience that may possibly be helpful to you, but I have quite a few patients that come back once a month; they refuse to take the necessary care and prefer to put the burden on me. Some of my confreres say, "I wouldn't have a patient like that, if a patient will not take enough interest in his teeth to follow out my directions." But it is rather pleasant to see these patients once a month, and if they want to leave a fee of \$3 or \$5 every time I spend an half hour with them, depending on the length of time I spend, it is perfectly satisfactory to me, and if at the same time I am able by that service to keep that mouth in good condition, I feel satisfied. That is only my own personal view of the case. Perhaps you would rather not have that line of practice, but if you undertake it, here is a thing that I have found most helpful in carrying it out; that is, to use, after the gums have healed, pumice with orange wood sticks in a suitable carrier. I am exhibiting two. This is the Harrell porte carrier, made by Dr. Harrell of Gainsville, Texas, and it is on sale in most of the American depots; and this is a porte carrier made by Dr. Skinner of Chicago. The one costs \$2 and the other \$1.25. The latter carries a wood point that they furnish with it by the box. I have found with a few of my patients who do not care to pay the fee for the frequent prophylactic treatment that a solution made of zinc iodide and potassium iodide and iodyne crystals is good. I think the solution, to be exact, is 45 grains of iodine, 15 grains of iodide of potassium and 15 grains of zinc iodide to four drachms of glycerine and four drachms of water triturated together, suggested by Talbot, Skinner's Formula. That applied to the teeth causes the dental plaque and all sorts of proteid matter to stand out, a yellow, ragged coating. The patient is given a mouth-glass and one of these instruments and directed to take the wooden point and rub that clean. They do not bruise the gums, and if you ask them to do that once a week many of them will do it, particularly those patients who haven't a great deal of money, but take great pride in keeping the teeth in good condition. These two instruments I have found invaluable, and perhaps you would like to look at them.

In the office, if I am doing the treatment myself, I use the same instruments, with as heavy rubbing as I am capable of giving to the teeth in line with the long axis of the teeth with pumice, and follow it up by deluging the mouth with warm water and washing out the pumice and then applying a combination of: iodine three parts, aconite two parts, carbolic acid one part, glycerine six parts, sponging that into the gums, and then have the patient follow it up with the ordinary vigorous massage. That cleans the labial and lingual surfaces, and to get at the interproximate surface many of us in Minneapolis have found this ribbon silk (which many of you know about, because some of you have told me of it) put up by Dr. Cutter of Brookline. It is a flat silk, the fibres held together by

wax, and you can insert it between the teeth, dipping it in a very fine pumice solution, and bring it back and forth with heavy rubbing, and you get a brilliant polish between the teeth in that way.

Now that constitutes the ordinary after-care that has been most helpful to us, and it is a thing I am insisting on the students doing, and let me tell you one more thing about this. In our college we have endeavored to teach this from the standpoint that I have tried to portray to you, viz., first, the absolute removal of everything of an infectious nature from the root surface, leaving the root surface a gleaming, brilliant white. Secondly, the student has to rebuild all points of contact, restore contour, and equalize the application of force to the dental arches. Third, after having accomplished all that, which embodies a great deal in many patients, and may keep the student at work half the winter finishing his case to that point, then seeing that case once a month, very often to the end of the winter season and giving it just such prophylactic treatment as I have tried to tell you about, and at the end of the year giving him a mark on the net result of the whole year's work.

Now, the boys that go out with that sort of an ideal built up in their minds, I think, will do better dental service for those they serve than they will with the old, haphazard method of just teaching them how to (as we dentists use to say) clean teeth.

Here, gentlemen, are a couple of curios, a couple of Dr. Riggs' original instruments for doing the surgical treatment of the root service. You might like to look at them.

PATHOLOGICAL CONDITIONS OF THE DENTAL PULP.

The pulp has one principal excuse for existence; it is the organ that builds the dentine. At six years old the pulp of the first molar is twice as large as it is at 12 years, and at maturity that pulp chamber has become infinitely smaller than it was at twelve years. In other words, the pulp has just this one excuse for living, and that is that it builds the dentine or the solid structure of the tooth substance, and after it has completed its developmental intent beyond the fact that it prevents the tooth from getting brittle, practically, I see no further excuse for the existence, and when I have a tooth to take care of in my clinic or in my practice, the pulp of which has been giving considerable trouble, I haven't the slightest hesitation in destroying that pulp, and the quicker I have destroyed it and removed it from the tooth the better satisfied I am.

Now, perhaps that is heresy, because I very well know that for years many of us have endeavored to classify these pathological conditions and to apply treatments to the various pathological conditions as we conceived them to be and have conserved these pulps for years and years with more or less comfort or discomfort to the patient, as the case may be. I think a dead pulp is like a dead Indian, providing it has been removed and put up on the drying rack, as they used to do on the Plains; and so I do a pressure anes-

thetia with a high-pressure syringe for these inflamed pulps, and remove them as successfully as I can, and where the high-pressure anesthesia has been persisted in so that the pulp is eventually anesthetized you can go to the root end with broaches and remove all of it and the subsequent treatment you give to such roots usually gives you a root that will carry any sort of structure you choose to put upon it.

Now many of you use arsenical preparations to devitalize these pulps that have become abnormally sensitive and you fail in part to get rid of them by that means because the pulp congestion is so great that the circulation is not sufficient to carry the drug into the pulp tissue and so permeate it and cause its devitalization, and you find when you begin to remove such a pulp as that that it causes a great deal of pain, and maybe you have to see that patient again and again and you have more or less distress in getting rid of the pulp. Now, what are you going to do with cases of that kind? There are two things that will give you a great deal of comfort, I think. One is the nitrous oxide outfit. Put the rubber dam on first if you choose and use all the aseptic precautions you possibly can, but just cut the Gordian knot and get rid of these sensitive pulps. That is the most satisfactory way. It is more satisfactory than the use of pressure anesthesia for the finishing of a case that fails by the arsenical road, because if you use pressure anesthesia the pulp ends are so inflamed that the patient complains bitterly of forcing in the anesthetic sufficiently to overcome the sensitiveness, while the use of the nitrous oxide outfit enables you to get it without running the chance of driving some of the anesthetic through the root-end and having a consequent traumatic inflammation of the tissues in the apical region as a result of the over use of the anesthetic in your endeavor to overcome the hyper-sensitiveness of the inflamed pulp tissue. And so I use the nitrous oxide outfit almost as a matter of habit to get rid of the type of pulp tissue.

However, after having used arsenic, if you do not have the nitrous oxide outfit at hand and wish to use pressure anesthesia, if you will mix your cocaine with pure phenol or carbolic acid, so that it is a syrupy mixture, you need not go to the trouble of weighing it up and having the exact percentage for this particular purpose. Just use your judgment. Take a little bit of cocaine crystal and drop enough carbolic acid on it to let melt down and make a waxy, syrupy mixture and apply with a few fibres of cotton with phenol to the root canal and drive it up under the pressure of unvulcanized rubber. Now you may possibly drive some of that pure phenol tissue beyond the root end, but subsequent inflammation is the result through the root ends, and that in itself will cause anesthesia of the of that phenol. You can compensate for that and avoid the often soreness by using immediately after light pressure with pure alcohol, which neutralizes the phenol. I have done it repeatedly and, while you may have a little after-soreness for a few days, it usually passes off.

There is one other objection to using pressure anesthesia under conditions where pus has gained access to the pulp tissue, as was illustrated in the slides shown by Dr. Webster last night, and that is that unless you use a phenol solution the staphylococci may be driven out from the apical foramen and spread infection beyond the root-end. General anesthesia for that class of cases is better than pressure anesthesia, but if you use pressure anesthesia with phenol you run the least possible risk of having a subsequent diffused infection as the result of driving it through the root-end, and if you follow that with alcohol, which does some damage, but not very great, you will probably get off with a minimum amount of depressing results from that method of treatment.

In all cases where pulps have become sufficiently inflamed to cause considerable pain for any considerable period of time I invariably remove them, and whether I am criticized for that or not I will stand by that statement.

Owing to this view of treating pathological conditions of the pulp, there is really nothing more for me to say from my standpoint regarding this question.

NITROUS OXIDE ANESTHESIA.

I have been asked to speak of nitrous oxide anesthesia. I have had a great deal of satisfaction in the use of nitrous oxide and oxygen. Some years ago, before the Teeter inhaling device was made, I commenced giving nitrous oxide continuously through a little mask that I made out of the half of a rubber ball, which I purchased in a department store and notched out a place for the nose and making the valves myself. I had never seen or heard of the Teeter valve or any other method for giving gas steadily, but I devised a little mask that I was able to administer it with, and I drew it directly from the nitrous oxide bottle into a bottle of water and allowed the gas to flow up through the water, and judged of the amount of gas that bubbled through the water, and, after having used that with some satisfaction for a period of time, I heard of the Teeter inhaler and purchased it, administering nitrous oxide to my patients for all minor surgery and began to think that it was a very great help and sought a way to make the administration easier and more successful and how to gain a steady flow of gas, but before I had time to devise anything helpful in that direction I learned of an outfit which was made in Iowa, which consists of an expansion tank, into which you may discharge the gas from the steel bottle and allow it to come to the temperature of the room and draw the gas by this inhaler to the patient in just an even, steady flow, with a pressure valve upon it to show you just the amount you are giving as the patient inhales it, and that outfit we purchased for the college and also for private use, and it consists of a tank about three feet high and eighteen inches wide, tested to a resistance of 300 pounds to the square inch, with the ordinary pressure valve, such as you see on steam engines, and a flowage valve to show the

pressure of the gas flowing by that flowage valve to the patient, and I have been using that now for a number of years without change, except that in the beginning I mixed oxygen with the nitrous oxide in definite proportions under the belief that I could maintain anesthesia longer and more successfully with it than I could with gas alone, but of late years we have discarded the oxygen apparatus to a great extent, using it only when we wish to recover a patient very quickly, or when there is anything of an untoward nature apparently happening during the anesthesia, finding natural atmospheric air entirely sufficient to maintain the patient in an absolutely safe state for even 15 or 20 minutes at a time. The advantage this plan has over the outfit that allows the gas to escape into a bag is that the gas is at the temperature of the room, and that it is discharged into this storage tank in sufficient amount so that you can put on the rubber-dam, sit down by your patient if you are going to take out a pulp, turn on the flowage valve to point to a half or two points and sit quietly there, and you know your patient is getting a steady flow of gas, and the result is you can maintain an even anesthesia with that kind of an outfit for a considerable period of time without paying any attention to the nitrous oxide itself, mixing through the Teeter inhaler just enough atmospheric air with the gas to maintain the patients' blood in a fairly well oxygenated state.

Now, there are some things regarding nitrous oxide that the beginner should be cautioned about, and one of them is this and one that I insist upon in the clinic publicly before any student is allowed to go into the anesthetic room: During anesthesia by nitrous oxide the mind is much more suggestible than it is outside of the anesthetic state, and I absolutely demand quiet in the operating room—no conversation regarding the patient except of a cheerful nature. I have known patients who entered the anesthetic state under nitrous oxide and who have had considerable operations of five or ten minutes done under nitrous oxide anesthesia awaken and say that they were quite comfortable, but detail conversations that occurred during that anesthetic state, and I believe that it is absolutely wrong for one to comment on a patient's state unless it is of an optimistic nature. If a student or a friend came into my operating room while I was administering an anesthetic and said: "My goodness! that patient isn't doing well, that doesn't look good to me, or aren't you afraid?" or expressed any fear regarding the patient, I would want him to get out very quickly, not because I had any ill-will against him, but because I think untoward suggestions to a patient in the anesthetic state, when the subconscious mind does take on and act upon suggestions, is a dangerous thing for the patient, consequently during the administration of nitrous oxide by this or any other method or any other general anesthesia we should never indulge in anything that will act sub-consciously upon the patient to his hurt and beyond using reasonable care to maintain a

sufficient mixture of oxygen to prevent the patient becoming cyanotic. I do not believe there is anything in this topic that I could help you with, and perhaps I have not helped you with what I have said, but there is nothing further I wish to say, because I know there are a great many men using these methods here who are just as competent to talk on this as I am. I think this closes everything I wish to say unless there is something to be said in closing this discussion: and I want to thank you again most heartily for having asked me to come over here. I have just had a jolly good time the whole blessed time, and I have learned enough about Canada in the brief time that I have been here to hope that the tariff bars may be torn down between the countries so that you boys can buy automobiles without having to pay 33 1-3 per cent. to some little firm in Podunk.

CHAIRMAN,—Now, gentlemen, I am not going to call on anyone to open this discussion, but if there are any questions you want Dr. Hartzell to answer, let us have them briefly and quickly.

DR. R.—How do you manage contracted root canals?

DR. HARTZELL.—I have tried not to overrun my time, but I find I have had an hour and a half now, and that is entirely too much, but the question regarding tortuous and contracted root canals is a vital one, and I will endeavor to answer it with brevity.

The best way, I believe, to open up these canals is to carefully place the rubber dam so as to prevent any possible damage to the surrounding soft tissues and introduce with the platinum broach chemically pure sulphuric acid and work it down into the canal for a moment or two, and then follow it up with pure sodium dioxide. You can open these canals in that way—I have done it repeatedly. It may sound very drastic, but if you neutralize the acid with sodium dioxide and wash that out thoroughly you can open up a root canal, you can enlarge it, if you are patient, clear to the apex. You will have to handle it with great care and judgment, but it is, I think, the safest way to open canals. I have repeatedly disgraced myself by drilling holes through the sides of the root canals with reamer, and I have really ceased to use the reamer, and I find I am much safer with sulphuric acid and neutralizing agent than I am with the reamer. If that answers the question, we will let it go at that.

SOME THINGS IN CROWN AND BRIDGE WORK.

A. W. THORNTON, D.D.S., L.D.S., TORONTO, ONT.

Read before Toronto Dental Society.

Sir William Rowan Hamilton, at one time astronomer royal of Ireland, wrote on the title page of one of his books, "There is nothing great in the Universe but Man, and there is nothing great

in man but Mind." After mature deliberation he might have added, "There is nothing in man quite so astounding as his inability or unwillingness to use that mind."

In the profession of dentistry this inability to think or unwillingness to see, is perhaps nowhere quite so apparent as in the condemnation that has been heaped upon, and the criticisms which have been levelled at, the teaching and practice of crown and bridge work.

What does the conscientious operator expect to do in the field of crown and bridge work?

1. Where a tooth has been lost or a number of teeth have been lost, from the dental arch, it is the aim of the operator to preserve or restore the integrity of that arch.

2. This preservation or restoration should be brought about with the least possible sacrifice, of serviceable natural tissue, and by the introduction into the mouth of the least possible amount of foreign matter commensurate with the service which the crown or bridge is to render.

3. To make such restorations natural in appearance, and to harmonize with the other features of the face.

4. To give to the patient a condition or feeling as nearly normal as possible so that there will be the least possible consciousness of the restoration which has been made.

Now, if I have correctly stated the aim of the operator in the field of crown and bridge work, the next question is, "Does crown and bridgework afford the best means to bring about these conditions and at what points is work of this class superior to any other method of restoration known to the profession."

Take the case of a person who has been unfortunate enough to lose the crown of an upper incisor or cuspid, either through accident or by reason of decay, leaving a good root in position—what method of restoration can be suggested that would be at all comparable to a carefully selected, properly adjusted porcelain crown. This is so apparent to every modern dentist that to spend time arguing the question would be criminal.

Or take the case of a devitalized molar tooth where there has been so great a loss of tooth tissue that only frail enamel walls are left on the buccal and lingual surfaces.

What better operation could be suggested than to fill the tooth with alloy and then over this properly filled and properly prepared tooth, place a carefully fitted and properly contoured, anatomical reproduction of the natural organ in the form of a shell crown.

What is true of the two cases which I have cited, is true of every tooth in either upper or lower arch, viz., where the crown of a natural tooth has been lost or so little of the natural crown remains, that restoration by any method of filling is impracticable, then the ideal operation is to restore the lost crown by a suitable substitute, carefully chosen, properly made, and accurately adapted. What is

true of crown work is true also in the wider field of bridge work.

Take the case where the upper central and lateral incisors are lost, the cuspid on the same side and the remaining central are very badly broken down. What method of restoration could be suggested that would meet so many of the ideal requirements as a properly made bridge?

But it will be urged, many of the crowns and bridges seen in the mouths of patients are badly made.

In addition to this many ill-fitting crowns are put on where crowns are not indicated at all.

To this must be added the fact that crown and bridge work has been the sheet anchor of the advertising quack and fakir.

To all this must be added the fact that thousands of teeth have been mutilated and finally destroyed because of ill-advised and badly made crown and bridge work.

To all of these charges, there can be but one answer made, "Guilty."

But all that does not detract one iota from the beneficent service rendered by the skilful and conscientious practice of crown and bridge work. All that is proven is that many operators are not skilful and that some are not honest.

But let us stop to enquire just here if the same could not be said, and similar charges made, concerning other fields of operation.

How many ill-fitting partial dentures are inserted by incapable or unscrupulous operators?

How many hundreds of thousands of teeth have been prematurely lost because of the presence in the mouth of well-made as well as badly-made partial dentures?

The same objection might be urged, too, in the field of operative dentistry. Alloy fillings are left unpolished and protruding beyond cavity margins; foil gold fillings are badly adapted and badly condensed; inlays lack mechanical retention and close adaptation.

But all these objections prove nothing against the proper use of any of these procedures of daily practice.

The whole criticism might be summed up by saying that careless operations are constantly being performed; that good operations are preferable to bad ones; that cupidity enters largely into the practise of some persons, and that honesty is preferable to dishonesty.

Let us not lose sight of the fact that crown and bridge work, in common with every other development in dental practice has been brought to its present status by a process of evolution. The compressed hickory stick has developed into the iridio-platinum dowel—the Richmond crown, with its full band, metallic backing, and gold tip, has been superseded by the cast-base porcelain crown—the open-face crown has given way to the lingual post or Carmichael attachment—replaceable facings have robbed soldering of its terrors, added stability to the finished product, and made repair easy,

while removable bridge work bids fair to do away with a disadvantage that truly, often, "smelled to Heaven," that of lack of cleanliness.

That much remains to be done, no one with sense will deny.

That many changes in the methods of constructing bridges are now almost upon us, the readers of dental literature know full well.

But for the degree of perfection to which we have already attained: for the lessened use for forceps (with all their attendant horrors), for the retention of facial contour and individuality; for the deliverance from full upper dentures with all their glistening regularity and artificiality; for ability to postpone that time when "the sound of the grinders is low"; for a better professional, social and financial status for the dentists of this western hemisphere, let us, "thank God and take heart," and let us not forget that these blessings have to a very great extent been not only contemporaneous with the growth and development of crown and bridge work, but are very largely due to that branch of our professional work.

It is true that crown and bridge work suffered as other progressive innovations suffered from a zeal that was not according to knowledge, but possibly these things are unavoidable? At the beginning materials and appliances were in a rudimentary condition and every man had to evolve his own technic. Evils could not be guarded against until these evils manifested themselves, and their causes were studied. Weak places could not with certainty be foreseen until the break occurred at the proverbial weakest link.

A standard Goddess comprising the esthetic, the utilitarian and the hygienic could not spring perfect in all her parts from the cleft head of a grossly imperfect and discredited prosthetic dentistry. But skilful, thoughtful and brave men have worked and labored, and in many, many instances failed—but who will dare to add—in vain. It is true that in this evolution, suffering has been brought about and failure has often resulted, and much sacrifice has naturally been made. Let us not forget, however, that sacrifice is the law of nature, as universal as the law of gravitation, as immutable as the changes of the seasons or the rise and fall of the tides. But to what extent have we profited by the failures of the past and what bedrock principles have we reached, concerning which we are able to say with confidence, "Upon this rock I take my stand."

We are safe in saying that we have learned to view with suspicion any crown embodying the full band principle. In ordinary cases the necessary preparation is so difficult that a perfectly fitting band is altogether the exception rather than the rule. No one is now deceived about the irritation and consequent absorption of tissue, due to an ill-fitting band. Hence we may lay it down as an axiom, that bands encircling the root of a tooth and passing beneath the free margin of the gum, are used only when the demand is imperative.

We have learned, too, the danger and instability of the so-called

open-face crown. I know full well that in some isolated cases such crowns have done good service as abutments for bridges, but such cases are so exceptional that I believe we are justified in saying that the use of open-face crowns has no place in modern dentistry.

We have learned, too, to appreciate the individual motion of the teeth during mastication and the effect of that motion on any bridge work that may be inserted in the mouth.

From that knowledge has grown the use of what, for want of a better name, is known as the loose joint abutment. By this we mean that while one end of a bridge may be securely cemented to the crown or root of a natural tooth the other end is supported by a spur resting in, but not attached to, an inlay in an adjoining tooth. At first sight, such an abutment may seem to lack stability, but a trial of the plan and a study of the principle will soon convince the most sceptical of its feasibility, practicability and utility.

Ready-to-wear crowns, because of their natural appearance and easy adaptation, have certainly "served their day and generation." But there was always the difficulty that robbed the careful operator of the pride which he might otherwise have felt in his operation and rendered his best effort temporary in character, that the periphery of the porcelain crown did not correspond to the periphery of the root end to which it was to be adapted. It is true that with the advent of porcelain work this difficulty might in some cases be obviated, but the principle was a difficult one to put into practice, and was seldom adopted. Now, however, when everybody is doing cast work, perfect adaptation to the root-end and continuity of outline with the porcelain crown, makes possible to the man of average ability, an operation so perfect and beautiful in its character, that a few years ago it was attempted only by the man of exceptional ability.

Just here let me say that the best results will be obtained if the dowel (preferably of iridio-platinum) be first soldered to a coping of pure gold about thirty-three gauge and this be carefully adapted to the root-end and the wax then adapted between the porcelain crown and the coping, rather than by adapting the wax directly to the end of the root. A little thought will convince you of the reason for this method of procedure. The pure gold is easily adapted, and by using a foot plugger or other instrument about the periphery of the root a perfect outline is readily obtained. This pure gold coping controls, if it does not prevent the contraction of the cast metal, thereby ensuring a fit more nearly perfect than would otherwise result. If an attempt be made to adapt the wax directly to the root-end, the overhanging gum tissue mars the impress on the wax, while the moisture which is always present, chills the wax, making adaptation more difficult.

Very extensive bridges are now sometimes made by the casting process, the molten gold being cast directly to the prepared porcelain facings. In such cases care must be taken to first unite all

the abutments with iridio-platinum wire, not only to strengthen the piece, but also to prevent the shrinkage which would otherwise take place and prevent the finished pieces from going to place.

Personally, I cannot see any particular advantages in the method, while it has, in my estimation, many decided disadvantages.

Porcelain as a material for bridge work, because of its many desirable qualities, approaches more nearly to the ideal than any other substance of which we have at present any knowledge. Its highly vitreous surface making absorption of the fluids of the mouth impossible, its low powers of conductivity, its absolute non-corrosiveness and the fact that the tissues of the mouth tolerate its presence well, make it from many standpoints, very highly desirable.

But while the advantages of this material are many and of a high character, its disadvantages are equally marked. Its extreme friability renders a very considerable bulk of the material necessary, while the method of manipulating the material demands the total destruction of the piece should repair ever become necessary. But where such a method of restoration is indicated, and the piece is properly made and adjusted, no other method has so far been devised that combines in itself so many ideal properties or makes possible in the construction of an appliance, so close a resemblance to nature.

Luckily, however, for the man of average ability, replaceable teeth may now be obtained for the bicuspid and molar region as well as for the incisors and cuspids.

The result is that a bridge may be made combining the strength of gold with the esthetic qualities of well-formed porcelain teeth, natural in color, and of a splendid texture.

While the technic of any dental operation is always exacting, the introduction of replaceable teeth for the molars and bicuspid has wonderfully simplified the making of posterior bridges and has robbed these restorations of many of their most objectionable features.

In conclusion, permit me to draw attention to a great forward stride brought about in crown and bridge work by the introduction of Goslee's interchangeable teeth, designed by Dr. Hart J. Goslee of Chicago and manufactured, I think, by the Consolidated Dental Manufacturing Company.

These teeth so combine easy manipulation, correct principles and natural appearance that their introduction will, I believe, prove a veritable Godsend to the busy man desirous of accomplishing the best results. For single-crown work in the anterior part of the mouth, they seem to possess the essential characteristics of an ideal replaceable crown, while for use in bridge work in the posterior region they are easily adaptable to either cast or soldered gold work.

As a final word, let me say, that notwithstanding all that has been said and written derogatory to the teaching and practice of crown and bridge work, it is, nevertheless the branch of our work

which develops expertness in operation, an appreciation of the esthetic side of our daily work, a higher esteem for prosthesis in general, and in the mind of the dentist himself a consciousness of self-respect and pardonable pride, born of the knowledge that he can produce a piece of work so perfectly finished as to command the admiration of all who possess any sense of mechanical skill, so close in its resemblance to nature as almost to deceive "the very elect," and withal of so serviceable a nature that by common consent the masses of the people are looking to the dentists of to-day as great benefactors of the race.

CASTING IN DENTISTRY.

G. H. RESS, D.D.S., L.D.S., TORONTO, ONT.

Since its introduction to the dental profession casting has received a great amount of attention. It has a very wide scope, being applied to the gold or alloy inlay, cast gold crown, spans for bridges and their attachments, and base plates of gold and aluminum for dentures.

In order to obtain a fairly good grasp of the subject, let us consider the making of the gold inlay, which is used in all extensive operations as a filling material in the place of foil, where the melting and condensing of such would take too long a time and place too much strain on both patient and operator.

For example in this case, let us take a mesio-occlusal cavity in a lower first molar, and proceed with the filling of it in the following way.

CAVITY PREPARATION.

The cavity is prepared the same as for gold foil, other than it must admit of the insertion and removal of the inlay; that is to say, there must be no undercuts and the walls must be parallel to permit the removal of the wax matrix without distortion. Still it should be mechanically locked in, as in this case, by a dovetail on the occlusal.

THE INLAY WAX.

The wax used as a model must be hard, not sticky, and of a smooth, even grain. It should completely volatilize, leaving no carbon residue; it should be capable of manipulation at a comparatively low temperature and still resist the heat of the oral cavity, so as to permit of its being carved and prevent dragging of its surface and distortion on removal.

To soften the wax place it in warm water and allow it to become soft slowly and evenly; it should not be subjected directly to the flame of a burner. Do not have the water too warm, as the less heat the less contraction; too great a heat forces the molecules apart, and the arrangement on cooling causes considerable contraction.

A slight amount of separation should be gained and a matrix then burnished to place around the tooth; the wax is now pressed firmly into the cavity and the occlusal surface is warmed with a spatula or hot-air and the patient made to close, giving the lateral motions, as in masticating. The surplus is now cut away, the matrix being removed, and the occlusal margins and contact are carved up and burnished with suitable instruments. To make sure of perfect adaptation a celluloid strip is moistened with glycerin and drawn firmly over the margins at the cervical and approximal portions. From time to time, cold water is applied to the wax to prevent dragging. With an explorer or fine-pointed instrument the wax is removed and examined at the margins, after which it is replaced and burnished down tightly to place.

SPRUE WIRE AND FORMER.

The sprue wire is warmed and attached to the wax at the most prominent and convenient place, and, if the cavity preparation is correct, should come out without necessitating the application of any stress, or the wax model may be removed from the mouth by fine instruments and the sprue wire warmed at the point and inserted into the body of the wax. Care should be taken to have it sufficiently imbedded, that it will not become detached, and also in no way affect the margins. This is very liable to be the case in small wax forms. The size of the sprue wire is usually about seventeen gauge, but depends on the size of the cast. In large restorations, as in bridge work, more than one sprue is used to equalize the flow to all parts of the mold. Wax may be used to supplement wire, and several may be attached to a wax restoration, coming to one common chute opening. This is now ready for investing, which will be considered later.

Another method is the use of artificial stone. For this suitable impression trays can be obtained, with different lengths of septa, which carry the impression material (a wax furnished with the stone) up into the interproximal space and takes a correct and definite impression of the tooth and its cavity, also takes an impression of the approximating teeth. This method is generally used where there are two approximating cavities, as the distal of a first bicuspid and the mesial of a second.

The impression is removed and dried, the powder and liquid that form the artificial stone are mixed to about the consistency of a silicate cement and inserted carefully into the impression with a small-pointed spatula of nickel, German silver or bone. As soon as the stone is set enough to hold its own weight without flowing, it is placed over a burner, the wax impression melted away, not pulled off, as with compound. By this time the stone is strong, but not hard enough until heated a dull red with the blow-pipe.

When this has cooled fill the cavity with wax the form the filling is to be, and the whole thing is invested and the gold cast directly against the stone.

A platinum or gold matrix may be burnished first, then a wax model made in on this and the metal and wax removed together and invested; the gold is cast against this metal matrix.

In large restorations it is often desirable and essential to make the restorations hollow. This may be done in many ways, but three of the best will be dealt with here.

The end of a small chip blower may be heated and the softened wax drawn up into it. By this means a cavity of any size is easily formed in the wax; care, of course, should be taken not to approach too near the marginal edges.

There is also an instrument for this purpose on the market, known as a wax sucker. It consists of a hollow tube, with a receptacle filled with absorbent cotton, the point of which is drawn fine and is metal; this point is heated and the wax is sucked up the tube and is collected in the cotton; the same precautions should be used not to injure the margins.

When the model or matrix is to be formed on artificial stone, a core of the stone is built up on the step and pulpal wall of the cavity; thus the wax is hollowed out without any chance of distorting the margins.

After the wax is secured to the sprue wire it is then placed in a hole at the top of the sprue-former, which is cone-shaped and fits the end of the flask or ring; when the sprue-former is removed it forms a depression or crucible in which the gold is melted. The wax model extends about a quarter of an inch above the end of the sprue-former.

SELECTION OF THE FLASK OR RING.

In the selection of a flask or ring for investing, one is chosen in accordance with the size of the casting, and should be sufficiently rigid to hold the investment during the heating and casting process. To secure the sprue wire some wax is melted around it at the top of the sprue-former.

INVESTMENT.

Before considering the technique of investing the wax model the materials used and their requirements should be considered.

The investment must be such that it will stand a high degree of heat with least possible expansion or contraction. It must be smooth to give an exact reproduction of fine lines and margins. It should also set fairly rapidly and be cohesive inasmuch as it should not flake off.

It is quite apparent that plaster alone is quite inefficient to use as an investment, on account of the amount of expansion and contraction; thus it is unfit. It requires additional material to overcome this condition, thereby making an investment that will be sufficiently staple to produce a facsimile of the wax model. There are many such ready-mixed preparations to be had, but among the best is a mixture of equal parts silex and plaster.

The manipulation of the investment has a great deal to do with

the success of casting. If it is mixed too thin and allowed to stand the shrinkage will be considerable, and a gold cast in such a mold at low pressure will cause a distinct variation in size. If high pressure is used to overcome this shrinkage it would result in the distortion of the investment and the production of beads, which will cause misfit. Therefore, the ideal investment must expand enough to counteract the contraction of the gold. It is advisable to invest the wax as soon as possible after it is removed from the mouth, so that the thin portions will not become distorted by extreme temperature. In mixing the investment it should be of such consistency that it will flow to all parts of the model and be entirely free from air bubbles. By revolving the bowl and jarring it nearly all the air bubbles may be removed, when mixing. In applying it around the model care should be taken to carry it to all parts; this is best accomplished by a camel's-hair brush or a fine-pointed spatula. Next moisten the flask or ring which has been chosen for the case and place it over the sprue-former and proceed to fill the flask, a surplus amount should be used, jarring it and rotating it, so that all air bubbles are excluded and the flask entirely filled after driving the investment to all parts.

In cases where several inlays are to be run at once they may be all mounted on separate sprue-wires, but on the common sprue-former and invested in the one flask or ring and all run at the same time.

When the investment has hardened sufficiently to be crystalline the sprue and sprue-former are removed and the whole investment is placed on a piece of iron over a bunsen and allowed to heat up gradually, but not allowing the flame to come in contact with the surface of the investment until the wax, carbon and all its byproducts are burnt out, which usually takes from twenty minutes to an hour. The best results are obtained by not having the flask and contents too hot, as this diminishes the expansion and subsequent contraction of the mass on cooling.

In order to force the molten gold into the mold which has been described it requires a pressure exerted on the metal in the molten state to overcome the atmospheric pressure of the air within the mold, that is, the force on the gold must more than equalize the air within to allow it to flow readily to place.

CASTING MACHINES.

The devices used for this method range from complicated structures to some of the most simple forms. Thus we may use nitrous oxide, compressed air, exhaustion and steam devices. To obtain the best results the appliances should be mechanically regulated that a definite amount of pressure can be obtained to force the gold accurately to all parts of the mold.

Among the machines obtainable on the market for this purpose is the Taggart Nitrous Oxide Machine, which consists of a gas reservoir and a gauge to regulate the pressure of the gas; the mass

of gold is melted in the crucible in the flask by means of the nitrous oxide flame, which takes but a few minutes, and when it reaches the fusion state the lever is instantly thrown down, the flame removed and the pressure of gas on the molten mass forces it into the mold, and thus makes the casting.

THE CENTRIFUGAL METHOD OF CASTING.

This appliance consists of a centrifugal arm on either end of a bar, to support the brackets containing the cups. In one of the brackets is mounted the flask or ring containing the mold with the wax burnt out, and on the other one nearest the handle which swings the machine is placed a counterweight. The machine is then wound up by the handle on the arm by turning it to the left. On the rim of the machine is placed a brake to control the speed and set in motion the arm. On the bracket immediately in front of the chute opening of the flask or ring a crucible is placed and the gold button is heated till it bubbles; then the brake is released and the arm is instantly thrown in motion and the gold thrown into the mold.

It is necessary to have the cup and counterweight at right angles with the centrifugal arm so that both face in the direction in which the machine is set in motion.

For small casts the machine is wound up not more than fifteen times, but this depends on the size of the cast—the larger the cast the less speed required.

Compressed air can be used in the same way as nitrous oxide. A tank is charged with air; a reservoir is attached to the tank, which is filled with air according to the pressure required. The amount necessary for casting is registered by a pressure gauge attached to the reservoir. By this method of exhaustion the air is removed from the mold before the metal enters it. To draw the metal into the mold there must be an exhaustion to more than compensate the atmospheric pressure within the mold and the force used to bring the metal into the mold is atmospheric pressure caused by the vacuum made by strong suction pump. The amount of pressure required for an ordinary cast is fifteen pounds, which is registered on the gauge. The amount of pressure can be regulated to suit the case.

After heating the metal sufficiently in the crucible the air is drawn from the mold, thus allowing the gold to drop in its place.

A very simple casting method is the use of steam. A metal cup of fairly good size is taken, filled with moldine moistened with glycerine or asbestos moistened with water, and a depression is made to form a chamber and keep it up off the molten gold. This is applied to the flask containing the molten gold in its crucible and held firmly down, the result being the generation of steam in a closed cavity with the only exit through the investment and being under a very high pressure it forces the molten gold into the mold. The amount of steam required is very little, as the pressure is very high because of the high degree of heat of the molten gold.

BRIDGE WORK AND ATTACHMENTS.

The casting process has overcome many difficulties in the construction of crown and bridge work, has simplified the technique of their formation, saved much time and labor and produced better results.

The making of large cast restorations can be accomplished by the matrix or wax method. To construct a bridge by this method the abutment fillings are put in place in the mouth and an impression is taken, a model is poured into this and the intervening structure can be formed in wax, cast and then soldered to the abutments on the model, thus giving their correct relation, or the whole bridge may be cast at once.

In some cases it is compulsory to have porcelain teeth on the bridge and for these cases diatoric, tube double crowns and facings are used, to give better results than ever before.

The difficulty of grinding an all-porcelain crown to the root has been effectively overcome by casting a joint between the end of the root and the crown, thus increasing the stability and permanency of such a crown.

The cast base or joint for a crown is made by applying a small amount of wax over the end of the crown and then forcing it to place against the root with the post or dowel in place. The wax fills the intervening spaces between crown and root, the surplus wax is trimmed off, the crown, dowel and wax are removed from the mouth, trimmed closely and the sprue wire is inserted into the wax so as not to affect the root or crown surfaces and the cast is made against the dowel.

In making cast shell crowns a band is used as it is impossible to get an accurate adaptation at the marginal edges of the gum. The band is made in all gold crowns, fitted accurately to the end of the root and contoured to proper shape, the occlusal end cut short of coming in contact with opposing teeth. Place a piece of wax of suitable size on the occlusal of the band, force it firmly to place and have patient bite into it. Remove the band from the root, fill with investment and allow to harden, then carve the wax. This is then mounted, invested and the cast made against the band.

In cases where the wax is thin between the crown and root cut a small portion of the lingual surface of the tooth away and this gives a greater body of wax for the insertion of the sprue and a stronger attachment.

For these cases platinum and gold alloy gives a stronger attachment than gold alone. Acelite is also used in posterior teeth for cast bases. Pure gold can be used alone for casting, but some cases require an alloy which is less ductile, such as 22k gold, or even gold and platinum alloy. Acelite or alloys of some baser metals may be used, and the technique is similar, only the amount of heat to melt the ingot varies widely.

CASTING BASE PLATES FOR DENTURES.

An advantage of the casting process is taken in the making of base plates for dentures with attachments for vulcanite work.

An impression is taken in the usual way, and a model is obtained of the same material as the investment, and upon this the plate is waxed up to shape as for a trial plate, excepting for the addition made for the attaching of vulcanite, such as loops, dovetail extensions or sprueing made in the wax and a wax rim on the inner and outer side of the plate.

The gateway or chute opening are made of wax and arranged in suitable locations on the plate, all radiating from one common sprue-former.

The size of the flask varies with the extent of the case and the investment is made of the same substance as the model.

Before investing the model it should be saturated with water, so that the surrounding investment will firmly unite with it. The investment is first smeared over the whole surface of the plate, care being taken to get it into all little inequalities and around the chute opening. The flask is then filled two-thirds full of investment and the case gently worked in until the edge of the sprue-former and the edge of the flask are in perfect contact, thus making a hollow when removed in the investment, in which the metal can be melted.

When the investment is sufficiently set remove the sprue-former and the flask is now placed over a low heat to avoid cracking and heat gradually increased until the wax and byproducts of its combustion are completely volatilized and the case thoroughly dried out.

It is now placed in position in the casting machine and metal placed in the crucible formed by the sprue-former and heated; no flux is required if aluminum is used, as it heats at a comparatively low temperature. The metal should be stirred to get the whole mass in a thoroughly molten condition and, when in a proper molten state the pressure is applied and the casting made.

Similar contrivances to those used for inlay work may be adopted for this work.

As a general rule, it is best to minimize the amount of metal used in casting, as that which remains in the chute opening and crucible contracts and tends to pull the metal away from the edges of the mold after it has been cast.

THE CANADIAN ORAL PROPHYLACTIC ASSOCIATION. WHAT IT IS.

The Canadian Oral Prophylactic Association is an association of dentists in Canada, with head office in Toronto, organized January, 1906, to devise and suggest preparations for the mouth which might be recommended to the public by the dental profession. It also promotes dental education and performs acts of charity.

EMBARRASSMENT OF THE DENTIST WHO RECOMMENDS MEDICINES HE KNOWS NOTHING ABOUT.

Every conscientious dentist has felt the embarrassment of being asked by his patient what mouth preparation he would recommend. He has no real reason for recommending one in preference to another because he has no more knowledge of the composition, value or action of one than another. It is humiliating to be asked such questions, and the consequence is a discussion of the subject is avoided. The field is left to the drug manufacturer and druggist to exploit. Thus, one of the most important duties of the dentist is put into the hands of another. That is what drugs should be recommended to the patient, how they should be used and what means should be taken to care for the mouth. It is true the dentist could write a prescription for each patient, but few, if any, druggists could properly compound it, and if they did it would cost tenfold. It was surely a worthy undertaking of the Oral Prophylactic Association to restore to the profession its own duties and responsibilities and to the public a saner dental prophylaxis.

INDIVIDUAL EFFORT TO GET PRESCRIPTION.

The situation had been talked over scores of times by scores of dentists, but with little hope of being able to recommend a tooth paste or tooth powder the composition of which they had any knowledge of. Dr. Harold Clark, then Professor of Materia Medica and Therapeutics in the Royal College of Dental Surgeons, Ontario, wrote many of the manufacturers of mouth preparations, asking if they would give him privately the prescriptions of their preparations, so he might with this knowledge recommend to his dental classes such preparations as seemed best. Little resulted from his inquiry.

ORGANIZED EFFORT TO GET PRESCRIPTIONS.

About this time Dr. A. J. McDonagh interested a number of his dental friends in the same subject and undertook to get the dental prescriptions from all the leading drug manufacturers of this continent. The idea was to go over these prescriptions carefully and study their action and then recommend to the profession the ones which seemed best. In this way it was expected that the dentist would have the prescription and recommend from knowledge. After a few months' work along this line it became clear that no prescriptions could be obtained.

ANALYSIS OF PREPARATIONS.

It was then decided to get samples of several of the preparations and have them examined by a competent analyst and upon the results of this make a recommendation to the profession. Professor W. T. Stuart assisted in much of this work. The analysis showed that almost all pastes examined contained what was then believed to be one of the most potent causes of dental caries, and has since

been proven to be the fact. Sugar in some form or starch was one of the chief constituents. It was clear that a tooth paste largely made up of sugar and starch could not be honestly recommended to the profession or the public.

ORGANIZATION OF AN ASSOCIATION TO SUGGEST MOUTH PREPARATIONS.

After a year or more of work on the subject it was thought best to form an association of those interested and undertake to make a tooth paste and a tooth powder and any other articles which might be deemed expedient in the line of oral prophylaxis. A committee was suggested to devise preparations which would not contain harmful ingredients and would at the same time remain aseptic, be slightly astringent, aromatic and contain sufficient grit to remove stains from the teeth and yet not wear them away if used according to instructions. The association naturally looked to the faculty of the Dental College and those interested in dental education to make up the personnel of the committee intrusted with so important a work.

THE COMMITTEE WHO SUGGESTED HUTAX.

Dr. J. B. Willmott, Dean of the College, graduate of the Philadelphia Dental College, Master of Dental Surgery, State of New York, Professor of Operative Dentistry and Dental Pathology, one time Professor of Chemistry, and also for some years a practical pharmacist, was chosen chairman. With him were associated A. J. McDonagh, graduate of Dental Surgery of the Royal College of Dental Surgeons, one time Professor of Crown and Bridge Work, now Lecturer in Pyorrhea Alveolaris in his alma mater, and Specialist in Pyorrhea Alveolaris and kindred mouth affections; W. Cecil Trotter, graduate in Arts, Science Department, University of Toronto, graduate of the Royal College of Dental Surgeons and University of Toronto in Dentistry, Lecturer and Demonstrator in Practical Chemistry in the Royal College of Dental Surgeons; A. E. Webster, graduate of the Chicago College of Dental Surgery, The Royal College of Dental Surgeons, Ontario, The University of Chicago Medical Department, Post-graduate in Bacteriology and Pathology, Rush Medical College, Chicago, Demonstrator in Bacteriology, Operative Dentistry and Dental Pathology, afterwards Professor of Operative Dentistry and Dental Pathology in the Royal College of Dental Surgeons of Ontario; J. Frank Adams, graduate of the Philadelphia Dental College and Royal College of Dental Surgeons of Ontario, member of the Board of Directors of the Royal College of Dental Surgeons of Ontario for six years. As consulting members of the committee, W. T. Stuart, graduate of the University of Toronto, Arts and Medicine, Professor of Chemistry and Anatomy in the Royal College of Dental Surgeons of Ontario, Professor of Chemistry, Trinity Medical College, Professor of Physiological Chemistry, University of Toronto; Harold Clark, graduate of the Royal College of Dental Surgeons and the Univer-

sity of Toronto, Professor of Materia Medica and Therapeutics, Royal College of Dental Surgeons of Ontario; W. E. Willmott, graduate of the Philadelphia Dental College, Royal College of Dental Surgeons of Ontario and the University of Toronto, at one time Professor of Materia Medica and Therapeutics, then Professor of Dental Technics and Clinical Dentistry in the Royal College of Dental Surgeons of Ontario.

The association believed then, and still believes, that it was wise in choosing such chemists, pharmacists, therapeutists, dental pathologists, bacteriologists and dental practitioners to prescribe mouth preparations which should meet all the requirements. It is presumption for men who are strangers to such subjects to advise what preparations should be used for the mouth. The difficulties of making the preparations or the cost could not enter into the work of the committee, because they or the association were not going to manufacture. No member of the association can ever gain financially from the operations of the association. Quality and efficiency is the only object.

A TOOTH PASTE WITHOUT SUGAR, HONEY OR STARCH.

When it was certain that a tooth paste could be made without using sugar, honey, simple syrup or starch, the association found it impossible to get any established drug manufacturer to make the product. It became necessary to instruct someone how to do it. Many manufacturing difficulties during the early years of the association hampered its progress, but now these difficulties are cleared away.

About the time it was decided to make preparations the association decided to collect a royalty for the sale of the products it recommended. In this way there was a means of keeping the products up to the standard and at the same time an opportunity to get money to expend in charity and education. The association obtained a charter which empowered it to do business for cash only.

TOOTH BRUSHES.

About three years ago a committee of the association devised tooth brushes which have no peers. The words of commendation which have come from home and abroad have been encouraging and gratifying to the association. Within a year a lingual brush has been added to the set, which is the king of all brushes for the lingual surfaces of the teeth.

At the present time one of the most reliable and widely known drug manufacturing houses in Canada, Lyman Bros. & Co., Limited, make Hutax Powder and Paste, while the brushes are made in England and sold by Hargreaves Bros., Toronto.

SUCCESS DUE TO MERIT ONLY.

The progress of the Association has been so gratifying and has been so amply supported by the profession that there will soon be thousands of dollars to spend annually for the good of the public

and the profession. There is not a dollar spent in advertising. All the association asks the dentist to do is to look over the prescription enclosed with each package, and if its merits appeal to him recommend it to his patients.

The brushes are sold on their merit only, as are the other products.

SCHOOL CHILDREN'S TEETH, THEIR UNIVERSALLY UNHEALTHY AND NEGLECTED CONDITION.

J. G. ADAMS, L.D.S., TORONTO.

Dr. J. G. Adams, the author of this small book has spent almost his whole life in the care of the teeth of the poor of Toronto. The quotation which we give below will illustrate to some extent the necessity for a better knowledge of the results of defective teeth. The author has collected a great number of facts and says a great number of things straight out as they occurred. While the arrangement and sequence of subjects and the selection of cuts might have been better, yet as a historical recital of the facts about oral hygiene in the past in Toronto it cannot be equalled.

A MOST UNIQUE HISTORY OF A NEGLECTED TOOTH THAT, THROUGH THE MISTAKEN DIAGNOSIS OF THE CITY MEDICAL HEALTH OFFICER, COST THE TAXPAYERS OF TORONTO \$364.



FRED GEE

"The history of this tooth is one of interest for several reasons: First, because of the serious mistake made by the city's Medical Health Officer; second, because of the legal action it incurred and the decision given; third, for the effect on the owner of the tooth; fourth, for the hundreds of dollars it cost the taxpayers of the city in which it transpired; and last, but not least, for the practical lessons that may be learned from its history.

"This noted tooth was a right inferior, permanent molar, belonging to an eight-year-old boy named Fred Gee, who lived with his parents on King Street in the city of Toronto. Fred was often troubled with this molar, particularly at night after going to bed, which is generally the case with a person troubled with an abscessed tooth. His mother tried all the customary remedies to give relief, expecting that the tooth would soon drop out, never suspecting that it was a permanent tooth. Instead of its getting better, it got worse; then the family physician was called in. He prescribed a linseed poultice to be applied on the face; this caused the abscess, which was forming, to point on the outside of the face. A day or two after the physician called and lanced it, leaving the tooth, which was the cause of the trouble, still in the mouth, the result being that instead of Fred's face healing up, the pus continued to discharge. The children of the school thought that Fred had some contagious disease and objected to sitting in the same room with him. The parents of these children complained too about it, and Fred was sent home from school and not allowed to return.

THE CITY MEDICAL HEALTH OFFICER DIAGNOSES IT AS A CASE
OF TUBERCULOSIS.

"As the teacher refused to allow Fred to return to school, his mother took him to the City Medical Health Officer, who diagnosed it as a case of tuberculosis, and advised his mother to keep him out of doors in the sunshine and fresh air as much as possible. However, this did not cure him; instead of getting better he actually got worse, and for over a year and a half the pus continued to discharge on his face, leaving poor Fred in a sadly run down condition.

DR. JOHN NOBLE FRED'S RESCUER.

"Providentially for poor Fred, Dr. John Noble, afterward school trustee and alderman, was called in to see one of the other children that was sick, and his attention was called to Fred's case and he was told the pus had been discharging for more than a year, that Fred was not allowed to attend school on that account, and that the other physicians had frequently told his mother that it would be dangerous to heal the abscess, as it would be almost sure to cause blood poisoning and perhaps end in the death of the child.

"Let me stop here to say that this is a very common belief, even among well-educated people as well as among some of the old-time physicians, as it was in this case; and for that reason abscesses are allowed to continue to discharge for years. I am constantly meeting with such cases, where young girls and boys are being disfigured for life from the effects of having their faces poulticed, and the abscesses left to discharge for years—cases where young women have had to wear handkerchiefs on their faces for years, to cover the disgusting appearance of the abscesses. I have a very serious case at the time of writing this—a case where a young woman's

health is being wrecked through having thus been neglected, until a large portion of the jaw has become diseased. If any person doubts the frequency or seriousness of such neglected abscesses, I would refer them to any dentist who has had a lengthened experience in his profession. In a city where there are many experienced dentists, it seems to me strange that physicians do not oftener call in one of these dentists for consultation. It could not possibly do any harm, and would often save their patients unnecessary suffering and disfigurement, as alveolar abscesses are very often mistaken for tuberculous troubles, with which they sometimes become complicated.

"Last winter a poor woman brought her daughter into the Dental Hospital to have a tooth filled. I found an abscess on the side of her face, which was disfiguring her very much. I asked her mother how long it had been discharging. She said for four years. I asked why she allowed her child to continue so long in such a diseased condition, as it was not only disfiguring her, but was injuring her health. She said that every person to whom she had shown the abscess had told her that it would be sure to cause blood-poisoning if it were healed up. The girl herself said that the odor from it was something awful, and that she could hardly bear it herself, and yet, through ignorance, she had been compelled night and day for four years to inhale this foul and poisonous gas. I examined her teeth and found that a dead root was the cause of the trouble, and so removed it, and in a short time the discharge ceased and her face healed up. The simple remedy is to take out the dead tooth or root that is the cause of the abscess, and the trouble (if not complicated by necrosis of the jaw, which very often happens when neglected too long) will soon cease, as I will show was the case with Fred.

"But to return to my story: We left Fred with Dr. Noble, the new physician, who was diagnosing his case. He found, first, that there was an abscess on the face, discharging pus, just below the inferior maxillary bone, and that in the mouth there was a badly decayed inferior molar tooth, with the nerve pulp dead, close by the fistulous opening on the face; second, that the tooth had often ached at night (not in the daytime), showing that the pain was not caused by a live, exposed nerve pulp; third, that his face had been poulticed to relieve the pain in the tooth, and that as soon as the poultice had drawn the abscess to a head and it had been lanced the pain ceased, and though the tooth had remained in the jaw over a year, yet, as the pus had continued to discharge, the tooth had given him no more pain. So he decided that the tooth was the cause of the abscess, and consequently extracted it. One of the roots was black, rough and much absorbed, showing clearly that he had correctly diagnosed the case. The after-results also prove this, for in two weeks after it had been removed the pus ceased to flow, and Fred's face healed up. You will no doubt think that as Fred's

face is now healed we have come to the end of this history; but not so. Though Dr. Noble gave Fred a certificate to go to school, saying that he was all right and that he had no contagious disease, yet the certificate was not accepted, and Fred was again sent home broken-hearted, the result being that his father entered an action against the Public School Board for damages, claiming that the child was being deprived of his education, and that his business, too, was being injured by it being reported at the school that Fred had a contagious disease, which deterred his customers from buying groceries at his store. The School Board engaged E. B. Osler to defend the suit, which came before a learned judge. The defence claimed that it was dangerous to the other children in the school to have Fred there with an abscess discharging pus on his face. A number of physicians were called on for the defence. They and the Medical Health Officer said it was a case of tuberculosis, and that it was not safe for him to be in the school, as there was a possibility that some of the pus might come in contact with a cut or scratch on the person of some of the other children, and thus cause blood-poisoning. One doctor said that some of the pus might drop on the floor, and, when dried, that some of the germs in it might be circulated in the air of the room, and thus come in contact with a cut or scratch on some of the children.

"Dr. Noble, who had healed Fred's face, claimed that it was strictly a case of alveolar abscess caused by the dead tooth, the proof of which was shown by the fact that though the abscess had discharged for over a year from the time the former doctor had lanced it, yet as soon as the tooth was extracted it immediately healed up. Strange to say, though Fred stood before them, perfectly healed, though badly scarred, the Medical Health Officer and the other physicians insisted that it was a case of tuberculosis. The result was that His Honor the judge, without sending the case to the jury, gave judgments in favor of the School Board, saying the Board did right in suspending the child in the interest of the other children of the school, yet, strange to say, at the same time the judge gave Fred a permit to go back to school on Dr. Noble's certificate. I leave it for the readers to make their own comments on the justice of the decision by the judge. This noted trial lasted two days. The costs of the court, \$364.00, were assessed to Fred's father, and to collect which the bailiff was sent to seize the household and grocery effects; but as these belonged to Fred's mother he could not take them. The result was that the taxpayers of the city paid the costs. Of course the taxpayers of Toronto never think anything of a small bill like that, as they are so used to paying large ones!

(To be continued)

ELECTRICITY FOR DENTISTS.

FRANK D. PRICE, D.D.S., TORONTO, ONT.

CHAPTER VIII.

Control of Direct and Alternating Currents.

Commercial electricity is usually supplied to the dentist by a parallel three-wire system. Between the centre and either outside wire, there is a difference of potential of 110 to 120 volts, so that between the outside wires there is a difference of 220 to 250 volts. The tendency at present writing is to increase the voltage, the reason for which will appear later.

According to Ohm's law, the possible current in a conductor is equal to the pressure in volts divided by the resistance in Ohms. If, therefore, we interpose in our 110-volt system a resistance of 55 ohms, we will have a current of 2 amperes. By a variable resistance we may obtain any amount of current whether we have D C or A C.

However, resistance to the flow of electricity always means a transference of electric to some other form of energy. In many instances this transference is for our profit, as the power of the motor, or the light of the lamp or the heat of the porcelain oven or the chemical action in electrolysis. If it be for resistance alone there is heat being produced, which energy is wasted. An instrument for supplying a variable resistance is called a *Rheostat*. It contains a substance, usually metal wire that is a poor conductor, or, in other words, offers a large amount of resistance to the passage of electricity. Heat is generated and provision must usually be made for its escape. Fig. 50 will illustrate a simple form of rheostat. It consists of coils of wire arranged and fastened on

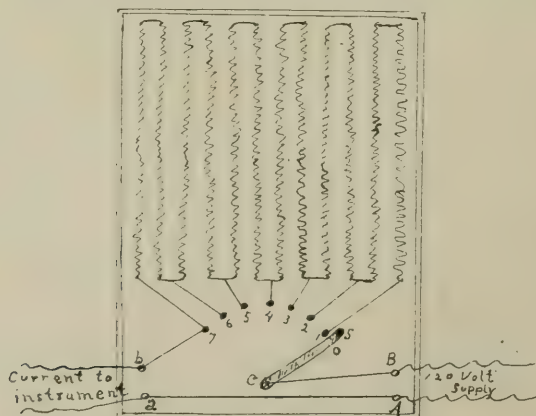


FIG. 50. WIRE RHEOSTAT.

a slab of slate or marble, so that from end to end there is a continuous circuit. A B and a b are binding posts for the leading in and leading out wires. S is a bar of metal hinged snugly at C and made to swing over and touch the metal contact buttons 1 to 7. With S against 1 the current may be traced from B through C and 1 and all the wire coil to b. From b it passes through the instrument and back to a and across to A. Each step in the movement of S from 1 toward 7 offers a shorter path to b, and thus offers less resistance. Suppose we used No. 24 climax resistance wire, and that our coil had a total resistance of 36 ohms or 6 ohms between each of two consecutive contact buttons. Then with a 120-volt supply current and the Switch S at 1 we would have for use at a b $120 \div 36$ or $3\frac{1}{3}$ amperes. At 2 contact button we would have $120 \div 30$ or 4 amperes at a b. At 6 we would have $120 \div 6$ or 20 amperes at a b and with S at 7 we offer a free passage for the electricity and obtain at a b the full 120 volts with whatever amperage it offers. We have not taken into account the resistance of our instrument, which may be a considerable.

A convenient form of high resistance for such dental instruments as use an ampere or less of current is found in the incandescent lamp. A mouth lamp may require a half ampere or less and a 16-candle lamp or smaller size will pass the proper amount. A 16-candle lamp on the 110-volt circuit passes about one-half ampere and other candle-power in proportion. The resistance we have described must be in series with the instrument. A more delicate form of resistance is illustrated in Fig. 51. Let A B be any form of resistance, such as a rod or carbon or a coil of wire, and connected in series with an electric lamp of any candle-power according to the current desired. C and D are metal springs that make good contact and slide on A B. From C and D wires are led out to the instrument I. This is called a *shunt line*. It can be seen that from C to

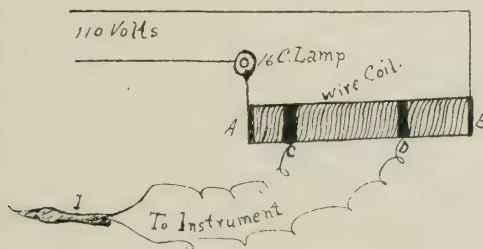


FIG. 51. SHUNT RHEOSTAT.

D there are two paths for the current, one through the coil and one through the shunt. The proportion of the current in each path will be inversely as the resistance in the paths. The resistance of I does not change, but the resistance of the coil C D is increased by moving C and D apart or decreased by moving C and D together. If C and D touch there is no resistance in the coil between them and no current

at all passes through I. By moving C and D apart the current to I is increased and a very delicate adjustment of current to I is possible. Reference will again be made to this form of shunt rheostat, in connection with dental instruments.

Reference has been made to the waste or loss of energy in the form of heat in a rheostat. Where there is a sufficiently variable form of current, such as is offered by the alternating, the voltage and amperage may be regulated by an instrument called a *transformer*. It will show why the commercial current supplied is so universally the A C.

Fig 52 represents a common form of transformer used in dental switchboards. M is a closed magnet built up of thin plates of soft iron called the core of the transformer. Two windings of insulated wire are shown called primary and secondary windings. With every

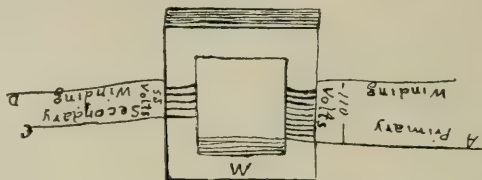


FIG. 52. SIMPLE TRANSFORMER.

change of electricity in a conductor surrounding a soft iron core there is induced a corresponding change of magnetism in the iron core.

Let us remember that the alternating current is constantly changing. Could we follow one cycle we might start with a maximum current in one direction, which, rapidly becoming weaker, would cease altogether and at once start to go in the opposite direction, increasing until it arrived at a maximum current in that direction, then weakening until it ceased, and at once start in the original direction and increase to maximum. And we have a corresponding change of magnetism in the iron core. It is also worth noting that *the magnetism of a soft iron core is such as tends to oppose the electric current in the wire that surrounds it.* By the laws of conservation and transfer of energy, we have the current in the primary winding A B, a very small part changed to heat in the winding and in producing local circuits in the magnet, but the most of it changed to magnetism in the iron core.

Bearing this in mind, let us see what happens at the secondary winding. In Fig. 52 the secondary is shown at the opposite arm of the magnet. It might be on the same arm as the primary and insulated from it. *A changing magnetism in an iron induces a corresponding changing current of electricity in a conductor that surrounds it.* And we may add that it is only with the change of magnetism in the iron core that a current is induced in the conductor surrounding it. Hence a transformer would not work on the direct

current. Applying our rule to Fig. 52, the changes of magnetism in M induces currents of electricity in the secondary coil $C D$. And when we know that the current induced in $C D$ is in a direction such as tends to oppose the magnetism of M , we find a reverse transition from the primary, the change from magnetic to electric energy.

One more step and we have followed the changing power through the transformer. *The voltages of the primary and secondary windings bear the same proportion to each other as the number of turns in each winding.* In Fig. 52 the primary of 110 volts is shown with ten turns around the coil. The secondary has five turns, hence the secondary would be a 55-volt current. If the primary had 100 turns and the secondary ten turns the secondary would be one-tenth of 110 volts or a 11-volt current. This would be a step-down transformer. A step-up transformer is used for producing X-rays. If the primary is a current of 110 volts and the secondary has 1,000 times as many turns as the primary, there would be induced in the secondary current 110×1000 or 110,000 volts.

We have not yet taken account of the amperes of current in the secondary of a transformer. We can see that a transformer may have its primary winding to carry, say, 5 amperes at 110 volts. We multiply volts and amperes to get the energy, which here is $110 \times 5 = 550$ watts. *The amperage of the secondary current of a transformer is in inverse ratio to the volts.* Thus, if we make no allowance for loss in the transformer, we should have the same number of watts in the secondary. In Fig. 52, where we have half the number of turns in the secondary as the primary, we should have double

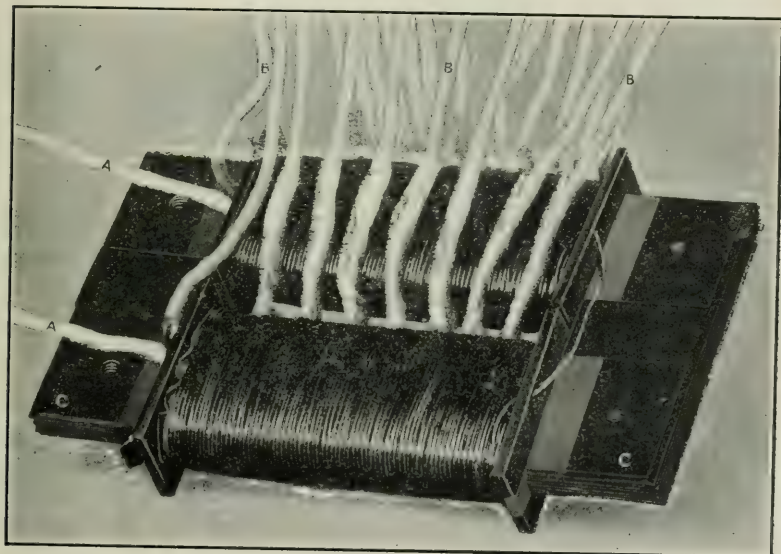


FIG. 53. DENTAL TRANSFORMER.

the amperage. And this is the case. As we decrease the voltage in the secondary we increase the amperage. Thus, from a primary of one-half ampere 110 volts we may have for dental canterly work a current of 6 volts and 9 amperes. Or with our 110,000-volt current for X-rays, if we took 10 amperes on the primary, we would have a little less than one-hundredth ampere on our secondary. In connection with X-rays, we shall consider another form of transformer called the Induction Coil, which is nearly the same in principle as the transformer. The principle of the transformer will also assist us to understand the reason of the various voltages on transmission lines as described in the next chapter.

In Fig. 53 is shown a transformer such as is placed behind a dental switchboard. Here is shown the rectangular iron core composed of thin plates of soft iron. There is also shown the windings. The different leading out wires from the secondary are shown above. By leading out wires from different places along the secondary winding we can get different voltages or amperages, as desired. The ends of primary winding are shown at the left. By leading out wires along the primary winding we may vary the number of primary turns in use, as well as the number of secondary turns, as shown in Fig. 53.

The reader will recollect the statement that a motor generates a current in opposition to that supplied to it, and so consumes only as much current as it needs for the work being done. In like man-

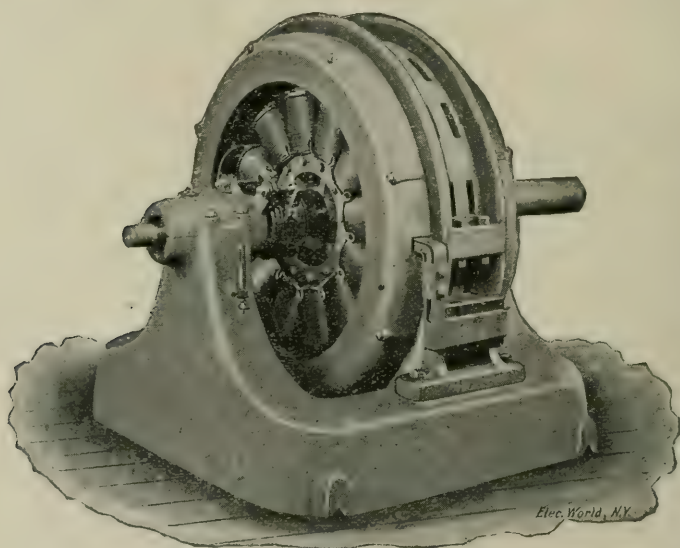


FIG. 54. A.C. DYNAMO.

ner the magnetism of the core of a transformer opposes the primary current that produces it. The secondary will take from the magnetism of the core only as much energy as is needed for whatever

work it is doing. We thus see the wonderful efficiency of a properly-constructed transformer, one that has plenty of iron in the core to receive the magnetism obtained from the primary current. If the secondary is doing no work, the primary is taking very little current. Some current is always used in warming the conductor and in magnetic eddies in the core.

CHAPTER IX.

Electric Transmission.

Steam power has been generally used in the generation of electricity on a commercial scale, though use is made of water power where it is available. Fig. 54 shows a modern A.C. dynamo capable of producing 50 amperes at 1100 volts.

In the earlier years of commercial supply of electricity the direct current was quite universally used. This was because at that time direct current machinery was much more efficient than was alternating current machinery. The distance for transmission was not great, and the current could be delivered at the same voltage as it was generated. However, the demand for electricity rapidly increased and these first transmission lines were found too small. The increased current occasioned too much loss through the heating of the conducting wires. Some remedy had to be found.

It will be remembered that the heat in a conductor is proportioned to the square of the current (amperes) multiplied by the resistance. To reduce the resistance by providing sufficiently large conductors was not economy. To supply the needed electric energy in the form of increased pressure (voltage) and at reduced quantity (amperage) was an easier solution, as it permitted the use of existing conductors. Some plan, however, must be adopted for reducing this high voltage for consumers. The transformer offered a ready solution if the current be alternating. And this is why that, excepting, perhaps, within a small radius of the power plant, the current supplied is generally alternating.

A demand was thus created for alternating machinery and electrical engineers have been equal to the occasion. The once seemingly impossible is accomplished, and alternating current machinery is becoming more popular than was even the direct current machinery.

Formerly many transmission three-wire lines delivered current at 55 and 110 volts. Later the voltage was stepped up to 110 and 220 volts, the 110 volts for lights and the 220 volts for power. That was thought as high a pressure as was safe for the consumer. Better methods of insulation have been provided and now it is common to supply to consumers at 220 and 440 volts on the old D.C. lines. The companies supplying the current have made this increase, and a few figures will show the reason. Suppose a branch transmission line be carrying 50 amperes at 110 volts. The amount of power is represented by $50 \times 110 = 5,500$ watts. If we know the resistance of

the conductor we can tell how much loss there is in transmission by heat. Let us suppose the resistance is 40 ohms. Then the heat produced in the conductor is $50^2 \times 40 = 100,000$ calories. Now let us step the current up to 440 volts and see how much is lost in heat. To produce the same number of watts at 440 volts we would now have a current of $12\frac{1}{2}$ amperes at 440 volts ($12\frac{1}{2} \times 440 = 5,500$ watts). But the heat now in the same conductor is $12\frac{1}{2}^2 \times 40$, which is 6,250 calories instead of 100,000, a decided gain. Resistance is always directly in proportion to length of transmission lines, and the only way to economically transmit electricity over long distances is by using very high voltages. A voltage of 330,000 has been tried on the hydro-electric lines from Niagara Falls to Dundas, and has been found possible. There is, however, some current lost by escape into the air, especially if the atmosphere be damp.

One of the most perfect electric transmission systems in the world is conducted by the Ontario Government, and is called the Hydro-Electric System. It proposes to harness the available water powers in Ontario and connect them by a system of transmission lines that will supply electric energy to all important centres of population, as well as the rural population. The falls at Niagara is being utilized and the system is rapidly being extended northward and eastward to include other water powers. We believe that a brief description of the Niagara system is in order here, because so many dentists are supplied with current from it.

The Ontario Government, through its appointed commission, called the Hydro-Electric Power Commission, accepted tenders from the different companies at Niagara Falls supplying electricity, and finally entered into agreement with the Ontario Power Company

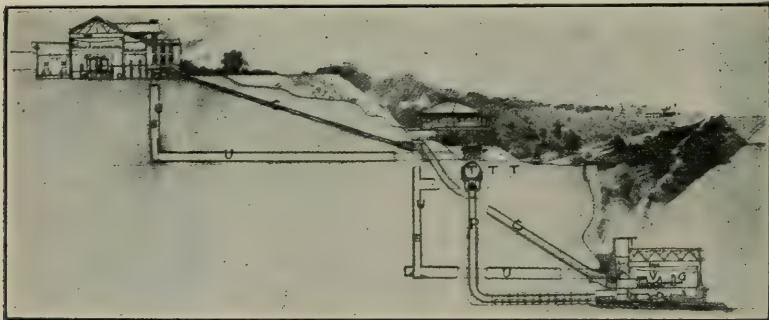


FIG. 55.- ILLUSTRATING THE ONTARIO POWER COMPANY'S GENERATING SYSTEM.

for a supply of 30,000 to 100,000 horse-power as would be needed at a specific price. A horse-power is 746 watts. The Ontario Power Company's power plant is situated on the Canadian side of the Niagara River at the foot of the rocky cliff and at the base of the Canadian Falls. Water is taken from the river half a mile

above the falls and carried in 18-foot circular tubes under the surface of the ground to opposite the power house, where it is led down through the solid rock and out to the power plant, as shown in Fig. 55. This represents a cross section cut through the ground, showing the 18-foot pipes at T. T. T.

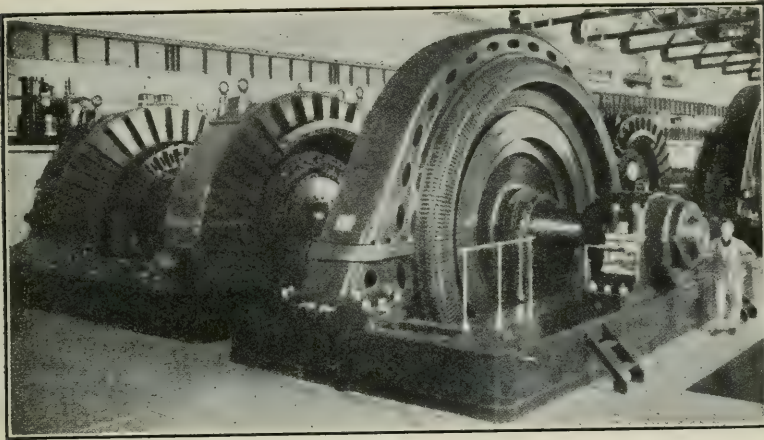


FIG. 56. SHOWING ONE OF THE LARGEST ELECTRIC GENERATORS IN THE WORLD AND THE TWO WATER TURBINES THAT DRIVE IT.

Only one pipe is shown in operation, and is capable of supplying 60,000 horse-power. P shows one of the 9-foot penstocks leading vertically down, then horizontally out below the power-house. It

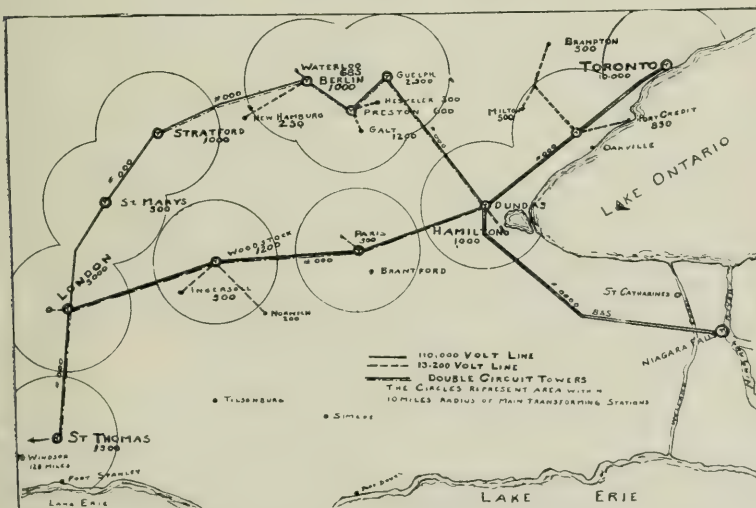


FIG. 7 AREA SERVED BY ONTARIO GOVERNMENT TRANSMISSION SYSTEM

FIG. 57. AREA SERVED BY GOVERNMENT FROM NIAGARA FALLS.

is controlled by electrically operated valves, in a chamber hollowed out in the rock below T. C. C. shows a passageway for the electric cables from the power house up to the top of the hill above the bank to the transforming station. At U. U. U. U. is shown an underground passageway, which includes two elevators. In Fig. 56 is shown one of the units of power, consisting of a 12,500 horse-power generator at the right and the double water turbines at the left that drive it. The current is supplied by the Ontario Power Company from these generators at a pressure of 12,000 volts and delivered to the Hydro-Electric Commission at their transformer stations on the hill. Here it is stepped up to 110,000 volts and sent out on the transmission lines over the area substantially shown by Fig. 57.

The transmission line is nearly 300 miles long, and consists of a line of steel towers 65 feet high and 550 feet apart. Each tower carries two cross arms 17 and 35 feet long, from which are suspended aluminum cables No. 0000 B. and S. gauge. For these cables 1,600,000 pounds of aluminum are required. Fig. 58 shows a line of towers, with one in course of elevation. At Dundas is a central

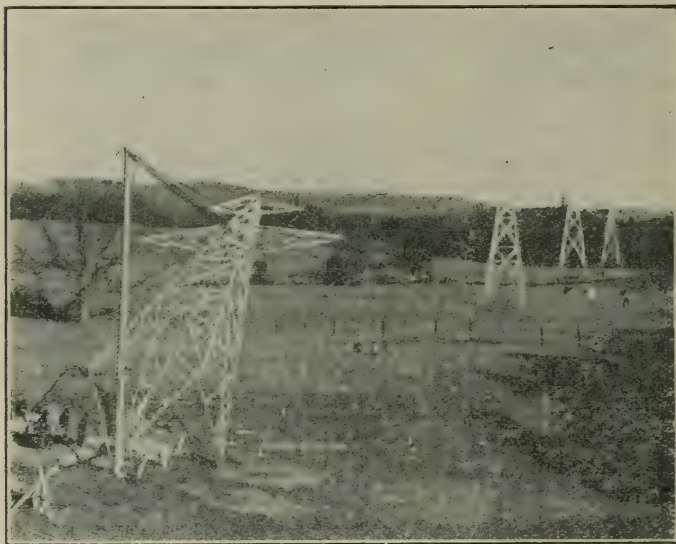


FIG. 58. LINE OF TOWERS IN DUNDAS VALLEY.

distributing station. West of Dundas the line forms a circuit, so that if an accident happened the line anywhere power could be supplied from the opposite side.

The different municipalities along the line have contracted for certain amounts of power. The voltage is stepped down for them to 13,200 volts. The municipalities further reduce the voltage for local transmission, usually to 2,200 volts. Step-down transformers

are placed at convenient centres along the streets, where the voltage is lowered to 110 and 220 volts for service to consumers. Fig. 59 shows a local transformer, which may be seen on the cross-town poles where the current is stepped down from 2,200 to 110 volts for domestic use.

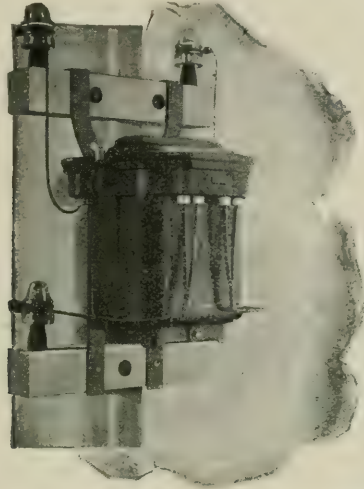


FIG. 59. STREET TRANSFORMERS.

Electric current is supplied to consumers sometimes at a *flat rate* or, as is usual, by meter measurement. Meters show by a metric system of pointers how much current in *watt hours* is being used, Fig. 60.

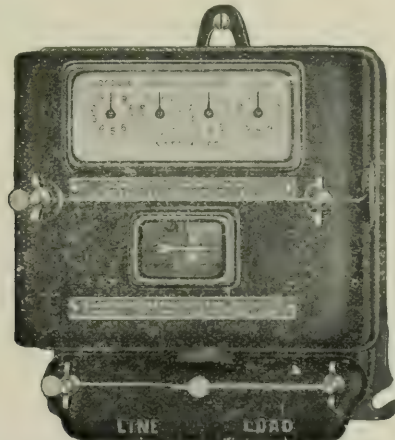


FIG. 60. DOMESTIC WATT-HOUR METER.

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VOL. XXIV

TORONTO, APRIL 15, 1912

No. 4

FACULTY OF DENTISTRY, DALHOUSIE COLLEGE, HALIFAX, N.S.

At first reading, the above Institution would seem to be a new star to rise in the East, but it is really our old friend the Maritime Dental College under a new name. The Maritime Dental College has been made a full teaching Faculty of Dalhousie under the above title. We have been greatly interested in the effort of the Nova Scotia Dental Association to establish a Dental College in the Maritime Provinces. There is a very real reason why such an institution should exist in that part of Canada, especially since the establishment of the Dominion Dental Council. Many have thought it quite impossible, but during the four years just past the men who have had the institution in hand, have seen it grow steadily until now the possibility of such a school being able to exist has been demonstrated, and with the co-operation of the Dental Association and other Faculties of the University a Dental School has been founded, which is able to carry on the work of every department with an efficiency quite equal to the best.

The action of Dalhousie in making this a teaching Faculty is sufficient guarantee that the high standard set by the Maritime Dental College will be maintained. This month the first graduating class will receive the degree of D.D.S. The Dental Association has still a substantial interest in the department and appoints a part of the professional examiners.

The Dental Board has elected the Dental Faculty of the University as professional examiners for registration in co-operation with men appointed by themselves. The profession in the Maritime Provinces is working together to make this institution one of which Canada can be proud.

REPLY TO AN INSINUATION.

In a recent publication appeared an insinuation that the DOMINION DENTAL JOURNAL is in some way controlled by dental manufacturers. If the writer had seen fit to make a direct statement it could have been easily settled. As it is we must be content with saying that the policy and control of the DOMINION DENTAL JOURNAL is absolutely in the hands of its publishers.

A SUGGESTION.

At a recent meeting of the faculty council of the Royal College of Dental Surgeons of Ontario, a resolution was passed suggesting to the Board of Directors the desirability of having the affairs of the School of Dentistry managed by a commission of three instead of two as at present. At present the duties of the representative of the Board are defined as those relating to the general business management of the school, having to do with the finances and general supervision of clerks, janitors, supplies, equipment and building. The Dean now has charge of the teaching and all that relates to the educational end of the working of the school. It is clear to anyone that the work of each cannot be clearly separated from that of the other. The success of teaching often depends upon the equipment, and the success of an equipment as a teaching aid depends upon the teacher. A Dean who has nothing to say about the finances or appointments to his staff has little influence in teaching. Thus it is duties which are inseparable cannot be performed in the best interests of the school without frequent consultations. The suggestion is that all the duties now delegated to the representative of the Board and all those delegated to the Dean or Faculty Council be performed by a commission of three, or, in other words, add another to the present two officers and all three together be responsible for the management of the school. In this way there would be a better co-relation of all the factors of a large educational institution. The plan would relieve any one person of too much responsibility and have the advantage of every act being the opinion of three, or a majority of three instead of one.

Editorial Notes.

Dr. S. Zimmerman has opened a dental office in Milton, Ontario.

Dr. VanArnam, Port Arthur, Ontario, died on March 24th, 1912.

Dr. Price, Wingham, whose dental office was destroyed by fire a few weeks ago, has taken over the practice of the late Dr. Meek, Orangeville.

The forty-eighth annual meeting of the Massachusetts Dental Society meets in Harvard Dental School Building, Boston, May 2nd, 3rd and 4th, 1912.

Dr. Angus V. Rose, a Picton boy, was accidentally asphyxiated in Syracuse, in experimenting with a new anaesthetic, while alone in his dental office. He was born in Picton in 1885, and went to Syracuse fourteen years ago.

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St. Lukes Hospital, Montreal, offers to give the city health authorities the free use of their perfectly appointed and organized dental clinic for the treatment of children whose parents are too poor to have their teeth attended to. The Hospital requests that the city grant to the hospital a portion of the Mourling bequest.

WANTED.

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St. Thomas, Ont.

Dr. F. A. Taylor, Moncton, N.B., has removed his office and residence to his new building on Church St.

The Montreal Gazette complains that the classification of children examined by the Medical Health Officer as defectives who have decayed teeth, as misleading. Such classification is not only not misleading, but it is an actual stimulus to parents and authorities to look after their children. Out of 27,000 defectives over 19,000 were so classified because of defective teeth.

"Dentists will tell you that the sugar you take in your mouth acts directly upon your teeth. Dentists shut their eyes to the evident fact that decay starts in the pulp beneath the intact enamel and honeycombs the interior tooth until the shell-like bridge of enamel breaks beneath the strain. The enamel gives absolute protection against the external attacks of acids and sugar. I have immersed sound teeth for months in a solution of fruit acids and sugar and have been unable to detect any erosion of either the enamel or the pulp."

The above quotation is from an article circulated among the weekly papers in Ontario. It is said to have been taken from a lecture published in the Dietetic and Hygienic Gazette. Such rot as this dies hard. Every dentist should take time to make it plain to his patients that decay of the teeth begins on the surface of the teeth.

WANTED.

In Port Arthur, Ont., a capable man to take charge of dental practice while owner is ill. For further information apply to Dr. C.N. Simpson, 225 Arthur St., Port Arthur, Ont.

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Proceedings of Dental Societies

ELGIN DENTAL SOCIETY.

Report by Dr. H. H. Way,

On Friday, March 29, 1912, the members of the Elgin Dental Society entertained Drs. Abbott, Smith, Thomas and Santo, of London in Dr. G. T. Kennedy's rooms, St. Thomas.

Dr. Colon Smith was the speaker and demonstrator of the evening, giving several stages in the making of seamless metal crowns. This was followed by a general discussion along the same lines. On motion, the visiting members of the Middlesex Dental Society were made honorary members of the Elgin Dental Society.

In an editorial in the Calgary News the Medical Health Officer gets good support for his recommendation for proper care of the children's teeth attending the public schools.

Public dental education is receiving a stimulus in British Columbia by lectures. Dr. Lewis Hall recently delivered a lecture on the teeth in the Metropolitan church.

MILLER MEMORIAL FUND.

To the Dental Profession of America:

The Committee appointed at the December, 1909, meeting of the Ohio State Dental Society, to raise funds to establish an American Memorial to perpetuate the memory of the late Dr. W. D. Miller, have, through the co-operation of the Honorary Committees of the several States, collected funds amounting to \$3812.50, with an additional \$450.00, subscribed but not paid in at this writing. The amount asked for from the several States was pro-rated according to the membership of the State Societies, several states have over subscribed the amount called for, others partially, while ten have failed to subscribe anything.

The proposed memorial will be a monument to consist of a life size bronze of Dr. Miller, mounted upon a granite base, with appropriate tablets, the cost of which will approximate \$8,000, and be a lasting credit to the profession. It is the desire of the committee to have a tablet stating that

funds were received from representatives of the dental profession in every state in the Union, and to this end we are soliciting funds, whether they be personal or society contributions: Ohio, Dr. Miller's native state, has contributed \$1,400 to the fund, which amount, through personal subscriptions and component societies will be increased to about \$2,000.

We are asking for a favorable consideration of the matter, by the various State Societies during the coming meetings, and hope the widespread appreciation of Dr. Miller's work for our profession will enable our committee to take steps toward the construction of this tribute to his memory at an early date.

Dr. Weston A. Price, 10406 Euclid Ave., Cleveland, Ohio, has been selected treasurer of the fund, and to him all subscriptions should be made payable.

Yours very truly,

Edward C. Mills, Chairman,

151 E. Broad St., Columbus, O.

J. R. Callahan,

25 Garfield Place, Cincinnati, O.

S. D. Ruggles,

Portsmouth, Ohio.

BRODIE MEMORIAL FUND.

Additional Subscriptions.

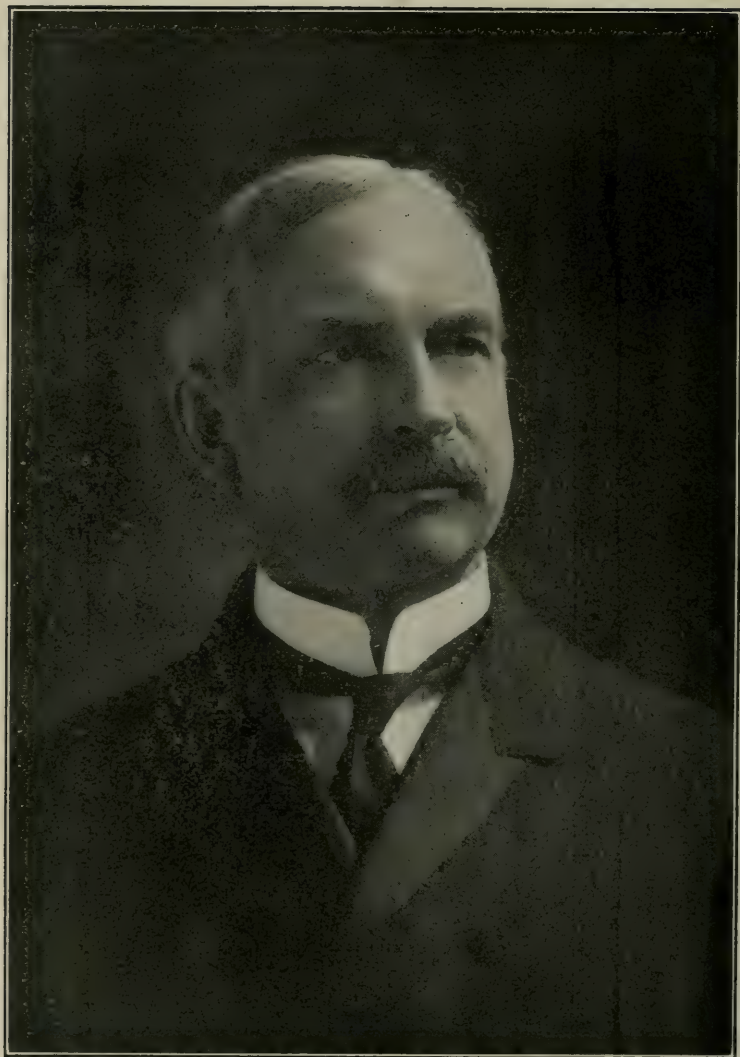
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At the last meeting of the Institute of Dental Pedagogics, the Executive Board decided to hold the next annual meeting in Pittsburgh, January 28th, 29th and 30th. The following officers were elected for the ensuing year:

President—Dr. H. Edmund Friesell, 1206 Highland Building, Pittsburg, Pa.

Vice-President—Dr. D. H. Squire, Buffalo N. Y.

Secretary-Treasurer—Dr. Fred W. Gethro, 917 Marshall Field Building, Chicago, Ill.



C. N. JOHNSON, D.D.S., L.D.S., CHICAGO, ILL.

Dominion Dental Journal

VOL. XXIV

TORONTO, MAY 15, 1912.

No. 5

Original Communications

TEETH AND HEALTH.

C. N. JOHNSON, D.D.S., L.D.S., CHICAGO, ILL.

Address delivered in St. Mary's Hall, Toronto, 26th April, 1912.

Mr. Chairman, Ladies and Gentlemen,—I am obliged to bring before you a few facts, and facts are sometimes dry, and yet I believe that some things that I have to tell you this afternoon may not prove to be wholly uninteresting. I want to speak to you in regard to what is becoming the problem of all governments—and that is the problem of public health. In the United States if a farmer out in the country finds that a hog is sick and he is puzzled to know what the trouble is with the hog, and he becomes fearful that the disease may spread to other animals on his farm, he writes to the Government about it, and the Government will send him explicit directions; and in almost every instance the Government will send an expert to his farm to look into the whole trouble, and point out what can be done so that the disease may be checked. That hog represents dollars and cents, and the Government has learned that the loss to an individual means a loss to the community in which that individual lives.

But there is another picture. Supposing a widow in a back street in one of our American cities is left with a large family to bring up, and she is doing her best to bring them up good, responsible citizens of the country in which they live. Supposing that mother becomes ill; something is wrong, and she does not know what it is, and she remembers that she is living under a very good Government, and she thinks she will write and see if she can get some suggestion from the authorities. She does so, and she gets a very polite note in reply from the Government, stating that, unfortunately, there is no department to look after her case. Which has lead Dr. Hurty, of Indianapolis, to remark that there is some advantage, after all, in being born a hog. (Laughter.)

Now, I want to say, to the everlasting honor of the Province of

Ontario, that that condition does not exist here to-day. Very recently there has been inaugurated a department of the Government that will look after the little widow and take care of her; and for this and other reasons I am proud of the fact that I was born in the Province of Ontario.

The reason that the Government will look after the sick animal is that the animal represents money, and it is a perfectly proper thing for the Government to do. But governments all over the world must learn the fact that the greatest asset of a nation is the human asset. Professor Irving Fisher, of Yale, has estimated that human disease has cost the people of that country an enormous sum of money, I won't pretend to say how much, but it runs into billions of dollars every year. You may wonder what all this has to do with oral hygiene, or health of the mouth. I want to point out the relationship that exists between the conditions of the mouth and the conditions that exist in the entire system. In the city of Chicago, some time since, we had an epidemic of scarlet fever in the schools, and the Health Department very properly quarantined the children who had it; and they were kept in their homes until the infective stage was long since past, and after the danger was supposed to be over they were allowed to return to school in the usual course. But the disease kept spreading; those children who came back after the requisite number of weeks of quarantine gave it to other children, and the Health Department was puzzled. Finally, Dr. Evans, then Health Commissioner of Chicago, began to look very closely for the reason why these children brought back the disease to the school, and he found that it was because they had cavities in their teeth, which were harboring the scarlet fever germs and keeping them alive for an indefinite time; and immediately the trouble disappeared when they compelled the children to have their teeth put into proper condition. In Valparaiso, Indiana, they had scarlet fever there for years; finally Dr. Nesbitt, of the Health Department, began to look into the matter very closely, and he came to the same conclusion, and he made a ruling that any child that had been suffering from an infectious disease should be sent to the dentist and have the mouth put into proper shape. When this was done scarlet fever was immediately stamped out in Valparaiso. And, if it is true that neglected teeth will carry disease—and it seems unquestionably to be the case—then surely it is time that we should stop this dental decay in the mouths of our children.

I should like to refer, briefly, to tuberculosis. No man, before any audience, can mention that word without causing a thrill to go through the people who hear him. The toll taken by this disease is something appalling to think of; and we are just beginning to realize that the prevention of a disease is better than the cure. I know of no profession which is doing so much for the prevention of human suffering as is the medical profession. No other profession could

reach the ear of the public as has been recently done by the medical profession. Dr. Evans has, I believe, done more in Chicago to direct public attention to the prevention of disease than any other man. He was the first man to get the ear of the City Council to have a dentist appointed as a regular member of the Health Department.

In this matter of tuberculosis I want to say that a man who has investigated it very closely has made the statement that much of the tuberculous from which people are suffering to-day comes, either directly or indirectly, from faulty conditions in the mouth. I am not a medical man, but I can explain, perhaps, what the conditions are. A cavity in the tooth of a child who is at all susceptible to tuberculosis forms a channel whereby the bacillus will travel down through the decayed tooth and cause an infection of the glands in contact with it, and that means finally the infection of the entire system. The tubercle bacillus has been traced directly from a decayed tooth down the canal in the root to the glands of the mouth and neck. Unless you keep the mouths of your children healthy you cannot expect the general system to be healthy.

I want to refer to another fact that shows the important influence upon human health of the condition of the teeth. Everybody knows that toothache is bad, but there is still another factor to be considered. If you have not a good set of teeth you cannot masticate well, and if you do not masticate well you do not digest well. Faulty digestion leads to faulty assimilation, and this to bad nourishment. Faulty nourishment in a child growing up will bring about results that you little dream of. Amongst other things, it will develop a craving for stimulants. I once heard an eminent minister argue that much of the drunkenness among men was due to bad cooking; that the system craved for stimulants when illy-nourished by bad food. If this be true, what shall we say of the growing boy or girl whose teeth are so neglected that the food, no matter how good it may be, cannot possibly be prepared for nourishment? I believe there are many men who are drinkers to-day because they have not been able to masticate their food properly, and I believe that there are many of the ills of life that can be traced to this cause.

I have been told sometimes that this contention will not hold, because there is old "Aunt Hannah" or "Aunt Jane," who has lived so many years without any teeth in her head at all. Nature becomes very tolerant of abuse, and people may lose one tooth after another, and the system adjusts itself to the new condition; but, remember, Nature takes her toll sooner or later, and in many instances, when the individual is taken sick and everything is done by the nurse and physician that can be done, the patient drops lower and lower, does not respond to remedies, and by and by succumbs, because of a cause that lies further back, and, in many instances, came from the loss of the teeth, which nobody at the time thought very important.

I have said that we have no right to bring up children without giving them the benefit of the very best we can do for them physically, mentally and morally. I do not know whether any of my audience have ever heard of Mr. Horace Fletcher, but I want to say that he has done more to direct the attention of the world to the necessity for good mastication than anyone I know of, and he is neither a physician nor a dentist. We had him in Chicago some time ago, and he lectured to an audience of about 3,000. He has given us a new English word—"Fletcherism"—which means perfect mastication.

There is no doubt but that thorough, intelligent mastication is of the greatest importance, and I am going to whisper in your ear that it will do more to reduce fleshy people and build up thin people than all the drugs in the market.

If dental disease is so serious it is about time that we began to look into the matter and see how prevalent it is. We have been doing that in Chicago, and we have examined about 28,000 children, and in that vast number of children we have found that about 95 per cent. are in need of dental service; and that brought us face to face with a problem that seemed to be one of the most serious that we had ever had to face. We have in Chicago about 400,000 pupils, and last year there were 8,000 children who missed their grades, simply due to the fact that they were handicapped by bad teeth, and the city is at the expense of teaching them these grades all over again; and, to say nothing of the loss of time to the children, it costs the city nearly \$300.00 to make up that defect. In addition to the fact that the child has been handicapped in its race in life, we have felt that that was a matter for the city authorities, and we have impressed this upon them so that we have got them to appoint a dentist as one of the members of the Board of Health of that city; for we felt that it was the truest kind of economy in dollars and cents that the city should furnish some kind of care for these children, whose parents were too poor to have them cared for in the regular way.

We have examination blanks that are made in triplicate—one copy for the Board of Health, one for the dental society, and one for the parent or guardian of the child—setting out the condition of the children's teeth; and, on the reverse side, there is the statement, signed by the superintendent of schools, that the teeth should be put in good condition, and that free infirmaries are being inaugurated whereby poor children can be cared for. I bring you a message this afternoon which makes me proud of the fact that I live in that great city. It so happens that I am the chairman of the Public Service Commission of the Chicago Dental Society, and have taken the interests of the work very much to heart. We were not able to get the Council to take up that work and give us the financial aid that we hoped for, and so we started out to raise funds. We now have the equipment for four free dental infirmaries in

Chicago, and we have had voluntary service on the part of a number of dentists to man these infirmaries and others to make the examinations. You can easily understand that to examine 28,000 children is no small task. The waiting list at these infirmaries became so great that it proved that the urgency of the work, and within the last two or three weeks we have received the assurance of one of the public-spirited citizens of Chicago that he will equip six additional free dental infirmaries, making ten in all, and that he will maintain these infirmaries indefinitely, out of his own resources, until we can prove to the city authorities that this is their legitimate work and it will be taken over by the city. He has pledged \$10,000 a year for salaries to operators.

I am not in favor of any individual providing the means necessary for this work, except as a temporary expedient. My dream at one time was to have a fund created by private contributions, and that the income from this fund should be sufficient to take care of these children; but the more I study the matter the more I become convinced that it is the direct duty of the city or the state to take care of these children. So we have this understanding that, as soon as we convince the City Council of Chicago to take over that work, and have it done under the public department of health, where it properly belongs—just as soon as that can be done, I want his private support to cease. I think that the burden should fall upon the people, because it is for the benefit of the people. This movement brings up the question of indiscriminate charity; and I believe that many of the charitable organizations, often with the best intentions in the world, do more harm than good. I believe that the moment anybody—man or woman—reaches out the hand and accepts something for nothing, that moment there begins a disintegration of character in that individual. So that our idea is to limit this to the children that have a right to be cared for, and clauses to this effect will be placed in the proposed agreement which I am now drawing up. At the same time, no matter who comes to these infirmaries, if he is suffering with pain, that pain is to be relieved instantly, without any question whatever as to the richness or poorness of the individual. It is the fundamental duty of every professional man to relieve pain at all times and under every circumstance. We have in Chicago what we call a school nurse; she goes into the homes of the children and notes the conditions under which they are living—the wages earned, etc.—and reports back to the infirmary; and it is only on the recommendation of the nurse, or a recognized authority in women's work, that we will render dental service, such as filling and other repair work of that kind. We do not wish to do more harm than good.

It is impossible for me to go into some of the details of this question as I should like to, but I want to refer to a movement that has been made in the city of Cleveland, showing whether or not dental service does mean anything to these children. A school was selected

in the poorer district, and a certain squad of 27 children were taken and their records for a year carefully looked up and noted. A physcological test was made, not by a member of the dental profession, but by a man who was entirely outside of this work; then a similar test was made after a year's experiments, and, after their teeth had been cared for by the dentist and they had been taught how to brush their teeth and properly masticate their food, it was found that these children, who had been failing in their grades year after year, now made their grades in every instance; and the test showed that their psychological efficiency had increased over 98 per cent.

This movement does not mean merely the physical improvement of these children, but it means the mental improvement as well; and when you improve a child mentally you improve him morally, too. I said that these neglected children craved stimulants; one of the boys in that school had been in the habit of drinking six or eight cups of coffee every day. His little system was not properly nourished, and he wanted that stimulant. After he had received proper care for a year there was a great improvement in his physical condition, and he was able to give up the coffee, because he was now properly nourished, and did not need that stimulant.

I want to refer to some other things. We have not the right to bring a child into the world and allow him to grow up under a handicap in any way. We have specialists who attend to irregular teeth, and some of these poor children need to have their teeth cared for in that way; and I can illustrate by a little story out of my own experience, how a defect of that kind may handicap a child through life. When my own daughter was attending school in the East and came home on occasional visits, she always did a good deal of talking about a certain Miss Blank, who was a teacher in the school. She spoke of her oftener than of the principal, and I said to her: "How is it that you are always talking about this Miss Blank? Who is Miss Blank?" "Why," she replied, "she has the brains of the institution. Everything is referred to her. If it is a matter of education, or even a matter of administration, it is always settled by Miss Blank." Then I asked: "Why isn't she principal of that school?" "My daughter hesitated a moment and said that she was everything that she had told me, but somehow she could never imagine Miss Blank being principal of any school.

Later on, at commencement, I visited that school, and was introduced to Miss Blank. Instantly I saw why she could not be principal of a school. Her physical appearance would not permit it, because her teeth had been neglected, as a girl, and were protruding so that her upper lip could not by any possibility cover them. It was a serious defect in that dear woman's face, and it might have been remedied if it had been attended to in time. It was a lamentable handicap, because but for that she could easily have been principal of any school.

Our in a Western city they have a condition to contend with whereby the children have what are called mottled teeth—that is, there are discolored places on them, so that as you look at the little children they give you a weird impression as of something uncanny. There is something in the environment of the place which causes this defect. There were two young ladies who had completed their course in the school and, after studying, had obtained their teachers' certificates and applied for positions in the school. They were refused on account of this defect in their teeth, the superintendent claiming that he could not place before his pupils any teacher with such a defect. The incongruous feature of the case was that these girls had been educated in these very schools. The Council of this city is at last awakening to the necessity of investigating the cause of the trouble. In this age, when everyone is working so intensely, and when we are talking so much about the survival of the fittest, we want to bring our children up so that they shall be fit to survive.

A short time since I was lecturing in the city of Edwardsville, Illinois, and we had about 1,200 people in the hall, and I was told of an occurrence that took place after the lecture that has left with me a very vivid impression. I made the same statement there that I have made to-day—that it was wrong to bring a child up handicapped physically, and I was told that after the lecture a little lame girl followed me to the hotel and watched me while I got into an automobile, which was waiting there to take me for a drive around the city. I didn't see the little girl, but I was told that she followed me with a wistful expression as long as she could see me. If I had seen her I never would have left that city without knowing something of the history of that child, and if it was possible to do anything for her I would have had it done. The superintendent of schools had arranged to take me round the city in an automobile; and, while that was interesting, I say that that little girl had more claim on me that moment than the Governor of the State of Illinois. I have written down there about her, and as sure as they find her I will have that little foot straightened, if it can be straightened.

I have detained you longer than I intended, but I wanted to say something about the care of children's teeth. First, there are the baby teeth; and the general impression is abroad that because it is a baby tooth it does not matter very much. That is wrong, because a little child is a bundle of possibilities, and takes on habits very easily, which are frequently never left off. One fortunate thing is that a good habit is just as hard to break as a bad habit. If that is true—and I believe it, for if it were not true we would not be to-day a bit better than heathen—then it is important for us to form good habits in childhood. A cavity develops on one side in these baby teeth, and there is a little tenderness, and the habit is formed of turning the food over to the other side; and, suppose a cavity develops in the other side, the child forms the habit of bolting its food without chewing it at all, and that habit stays with it in after-

life. If you don't believe it, go into any restaurant and watch the way the people masticate their food. Some will masticate thoroughly and others will simply bolt their food; and this arises very often from habits formed in childhood. Keep the teeth comfortable, so that the child can masticate thoroughly and comfortably, and it will grow up into a healthy man or woman. The tooth, of all others, that I wish to speak of comes in behind these baby teeth. It simply creeps in, without attracting any attention, about the sixth or seventh year. It is called the first permanent molar; it is just behind the baby teeth, and for that reason a mother will sometimes let that tooth decay, under the impression that it is a baby tooth. It is the most important tooth—the tooth that maintains the proper relation between the jaws, the keystone of the dental arch—and if you lose that first permanent molar you have lost in that particular mouth a force of character that you can never replace. This Miss Blank that I was speaking of had probably lost her first permanent molars, and there was too much overbite, as it is called, and that can never be fully restored when that tooth is gone. Dentists can do much with teeth, and it is the easiest thing in the world to save that, if it is taken in time. In the baby set there are twenty teeth altogether—ten above and ten below. If you start in the centre of the mouth and count five teeth each way, any tooth back of that is a permanent tooth; and I would advise you to look into this matter, and if this first permanent molar is there, by all means have it saved. It is likely to decay, because it comes in early and decays easily and rapidly.

Mr. Chairman, I want to express my appreciation of this splendid audience coming out on such a day as this. I accept it as a tribute, not to myself, but to the very important subject with which we are dealing to-day, and I am sure that, whatever the future holds for us, one thing is certain—our children are to be better cared for than they have ever been in the past. I want to thank the committee for bringing me over here. I was born out here about fifty or sixty miles, and I am always glad to come back, and particularly on this occasion, to bring this message to you.

A WEST INDIAN CRUISE.

M. H. GARVIN, D.D.S., L.D.S., WINNIPEG, MAN.

The ever increasing strain of modern life and particularly the ever increasing demands upon the energy and vitality of the dental practitioner of to-day demands that at not too long intervals one should insist upon having some "Days Off" in order to relax, to forget and to prepare for the years that are to come. To this end I have been asked to give a brief resume of a very delightful trip that it was the good fortune of Mrs. Garvin and myself to take early

in the year, a cruise of thirty-one days out of New York to the West Indies, Panama, and a few ports in the northern shore of S. America, or we might call it a pilgrimage to the haunts of the buccaneers whose exploits have made the Spanish main so rich in legendary romance. The pirates have long since passed away, but when one passes through the old fortified city of Cartagena, or views the castles of Bluebeard and Blackbeard overlooking the picturesque harbor of St. Thomas, the imagination is at once alive with the picture of Spanish treasure ships filled with silver bullion and gold ingots from Peru, of treasure islands and barrier reefs and sea fights, all of which exercises a charm that is irresistible.

Leaving New York 9 a.m. Saturday, Jan. 20th, on the good ship *Laurentic*, which was equipped with every convenience and even luxury for the comfort and pleasure of the 430 passengers, we sailed southward.

It is said that rough weather prevails off Cape Hatteras about 300 days out of 365, and we were fortunate in striking one of the 65. Within 48 hours out of New York summer clothes were in order, the flying fish were skimming over the waters, the water temperature at 6 p.m. Tuesday, just one hour out of Havana, being 78° F. The atmospheric temperature varied but little during the rest of the cruise, about 85° F. being a very popular figure.

As we approach Havana the view is novel and attractive. The town is low, the houses are gaily painted in tints of pink, and yellow, of brown, blue and green, and the dark red of the Spanish tile roofs is everywhere in evidence, while the stately palms on the distant green hills all tinged with a bit of color produces a study that is at once bright and charming. The entrance to Havana harbor is 350—400 yards wide; on the left is Morro castle, on the right the Malecon with its tropical shrubbery and music stand. Beyond the entrance the harbor expands into a beautiful bay $2\frac{1}{2}$ miles wide with room enough for 1,000 ships and dotted with odd looking boats peculiar to these waters.

Most of the steamships lie at moorings in the bay, and cargoes are discharged by lighters. In some parts this is due to lack of water, but in Havana it is due to the powerful lighterage interests which prevent a change of custom. It is estimated that during the $3\frac{1}{2}$ years of American occupation of Cuba the cost of lighterage was ten million dollars, which represents just that much increase in cost to the consumers. Going ashore on the ship's tenders and taking a cab up town we find ourselves among surroundings which proclaim that we are in a foreign land.

A massive style of architecture is everywhere in evidence, Havana being built to endure. The houses being of one or two stories have thick walls, high ceilings averaging 18 feet, windows running almost from floor to ceilings and guarded by iron bars or ornamental grilles. In warm Havana the people live much in public view and in the evening while driving through the residential district one is struck by the custom which etiquette strictly de-

mands of having the chairs arranged in two rows at right angles to the front wall, one row for the ladies and the other for the gentlemen. Much might be said about the lottery system in Cuba, the overcoming of yellow fever, the tropical fruits, but we must pass on, mentioning in passing a delightful motor ride out through rural Cuba through banana groves, pineapple and tobacco fields, and in every direction palm trees and the most beautiful tropical foliage.



Figure 1.—Palm Tree Drive.

We can but mention the oriental Spanish city of Santiago-de-Cuba with its narrow streets and ancient customs, and pass on to Port au Prince, the capital of the negro republic of Haiti, an interesting object lesson of the helplessness of the blacks when left to their own resources. This photograph shows a common Haiti style of architecture.

The natural resources of this island are phenomenal, particularly the hardwoods, and only the unstable form of government prevents outside capital from pouring in and turning chaos into prosperity.

At Kingston, Jamaica, one of the most thriving of the West Indian ports being under British rule, most at least of the male passengers purchased light summer suits as the lightest of garments were none too light. It was suggested later that we have a parade on deck and give a prize to the man with the most ill-fitting garments. At Kingston one of the treats was a trip out to Castleton gardens, the botanical garden of Jamaica, a distance of 20 miles, 6 miles by trolley through the best residential district, where the merchant princes, professional men and officials have their homes

and a drive of 14 miles through the mountains where one passes groves of bread-fruit, banana plantations, tobacco fields, sugar cane, cocoa and coffee plantations, while the roadside is draped with forms of every conceivable shape and size.



Figure 2.—Native Hut in Port au Prince, Haiti.

Our next stop is the Panama Canal. Anchoring at Colon the party takes a special train over the line of construction stopping at the Gatun locks to view this most interesting piece of engineering.

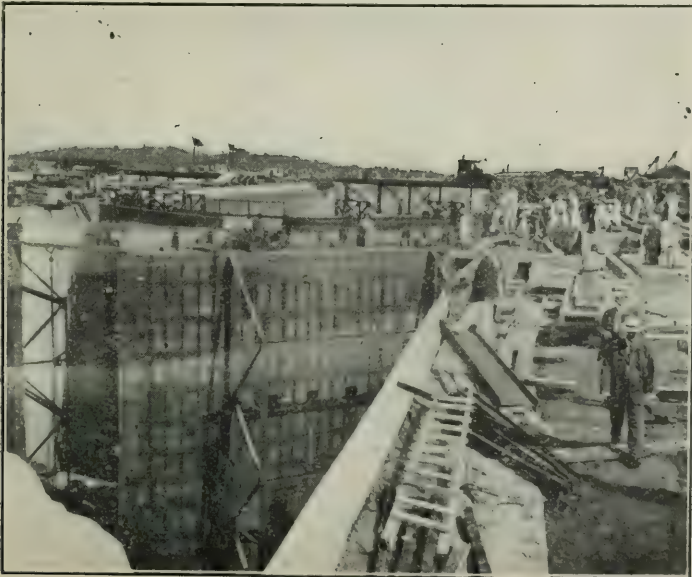


Figure 3.—Gatun Locks.

The Culebra cut is by far the most formidable part of the enterprise.

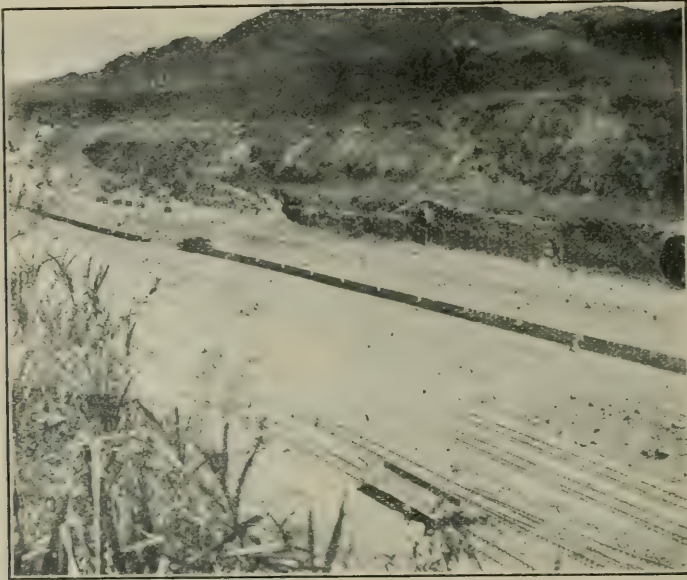


Figure 4 Culebra Cut

The Americans are making this cut 300 feet wide at the bottom, while the French had only intended making it 74. There are about 30,000 employed on the canal construction and the enthusiasm of



Figure 5.—Trinidad Home.

all is accounted for by the fact that a premium is placed on individual effort and brain power in the form of substantial rewards

which results in a decided loyalty among the workers, and perhaps the greatest credit for this is due to the shrewdness and ability of the chief engineer and chairman of the commission, Col. Geo. W. Goethals. As a result, this stupendous undertaking will be completed in less time and at a smaller cost than was expected. Much might be said, and the half has not been told of the great benefits of international moment to be derived upon the completion of this work.



Figure 6 —Pitch Lake.

Sailing eastward in 24 hours we are at Cartegena, the capital of Colombia, which, from a historic point of view, is one of the most interesting ports on the Spanish main, the first colony of Europeans on the Continent of South America being established at the present site of this city. Cartegena has the finest harbor on the north shore of South America and was fortified by the King of Spain 300 years ago as a stronghold and treasure house during the old buccaneering days. It was afterwards captured and sacked by both Morgan and Drake. It still remains a typical Spanish town.

Our next stop is the seaport city of Venezuela, La Guayra, the approach to which is most fascinating. The Sulla Mtn. rises abruptly 7,000 feet, whose base appears to offer no harbor in which a ship could safely anchor, and whose peak, when not surrounded by clouds, looks down defiantly on the waters beneath, knowing full well that an enemy would think twice before attempting to scale her sides. As the steamer draws nearer we see La Guayra nestled at the foot of this Gibraltar of the Caribbean, the white houses

with red roofs arranged row upon row like immense steps up the sides of this impregnable natural fortress. Caracas, the capital of Venezuela, is reached by a narrow gauge railway over the mountains from La Guayra, a distance of 23 miles, or 9 miles by mule path or 6 as the crow flies. In some places the grade of the railway is as much as 4.05 and the ride throughout is replete with most interesting sights, in fact the scenery is beyond description, each turn in the roadbed presenting now a valley, now a precipice, one to three thousand feet deep, here some mountain goats, in the distance a lonely hut, and in all a railway journey never to be forgotten. Caracas, with its hundred thousand people, lying in a fertile valley, has a delightful climate, with 80 F. being the maximum and never cold, supports its bull ring and is typically Spanish in architecture and custom.



Figure 7.—Scene on Martinique.

Another twenty-four hours finds us at Port of Spain, the capital of the British possessions of Trinidad, an island with its lofty hills clad all year round with tropical verdure, its beautiful streams and flowers and ferns presents a scenery unexcelled anywhere. The accompanying photo shows a typical home of one of Trinidad's merchant princes.

Here, too, we find the finest botanical gardens in the West Indies. Just outside Port of Spain is an interesting coolie village. In the northern part of the island is Le Brea, where the noted pitch lake is found.

The negroes dig up the pitch with picks and it is put in small cars running on rails laid right on the lake itself to be carried to the furnaces where it is melted into barrels. It is interesting to note that although the pitch is quite hard enough to walk on, it is soft enough under the heat of the sun to fill in within 24 hours

where any has been dug out. In the depressions and small crevices over the lake are pools of water, and here and there gas bubbles up which can be ignited with little difficulty.

A short stop at thickly populated Barbadoes, also under British rule, and the most windward of the Caribbee Islands, where the sugar cane is the principal industry, proves well worth while.

The French port of Fort de France, capital of Martinique, presents many beautiful scenes as the following indicates:



Figure 8.—Remains of Cathedral St. Pierre.

A couple of hours sail to the other end of the island brings us to St. Pierre, still one mass of ruins as it was after Mt. Pelee erupted in 1902, when this thriving, bustling city of thirty thousand people was wiped out of existence in a single instant, only one man escaping, and he a negro in jail at the time. Even now we see in every direction great evidence of the tremendous heat that warped out of shape the glass images and fused together heavy lines of chain. Since then nature has been trying to cover the awfulness of its work by causing to spring up shrubs and grass this calamity must have been and of our frailty in the face of such and vines, but one is still greatly impressed by the thought of what power.

A half day at Charlotte (Amalie), the capital town of the Danish Island of St. Thomas, and then we pass on to San Juan, Porto Rico's thrifty capital. Porto Rico is now under the rule of the United States, and here the writer found much of interest in looking into the conditions under which dentistry is practised. The offices are spacious, ceilings 18 feet high, large windows and tile

floors. The dentists themselves speak both Spanish and English. They all seem to have given up trying to make appointments, but see the patients in the order in which they come to the office. A number of dentists interviewed said they had tried making appointments at first, but that the patients would not adhere to it, and it had to be given up; which is accounted for chiefly by the mode of life a warm enervating climate produces.

Nassau, the capital of the Bahamas, is our last stop. Here we have the famous sea gardens, which, owing to the clearness of the water and especially to the color of the coral bottom of the ocean, one can see with unaided vision to great depth the exquisite coloring and beautiful shapes of submarine vegetation, while in and out among the plants and corals swim fish of the brightest hues of crimson, orange and azure. Here, too, is the land of sponges, the silk-cotton tree, and beautiful beaches for sea bathing. The accompanying photograph shows a view of the Colonial Hotel, the most beautiful hotel in the West Indies.



Figure 9 —Colonial Hotel, Nassau.

And now we are on our homeward journey. As the thermometer drops, warmer clothes are in order. Another day and out come the overcoats, and then the furs, and one must remember that one cannot do in the teeth of a north-east gale what one can do in the tropics. The tourist will no doubt bring back many souvenirs such as fans and panama hats from Cuba; laces, seeds and bead necklaces from Jamacia; East Indian drawn-work and silks from Panama; hardwood canes, parrots, Indian Coolie jewelry and calabashes from Trinidad; Bay rum, florida water and panama hats from St. Thomas; Porto Rico fillet lace and knitted work from their prison; sponges and tropical fruits from Nassau. But these things are not necessary to remind one and forever impress on the memory the exquisite beauties of the islands of our Southern seas, or the pleasant relaxation in the land where it is said that so many people "sit and think, or else just sit."

EXHIBIT FROM DR. CUSHING'S MUSEUM.

The convention of the Canadian and Ontario Dental Associations at the Brant House on June 3, 4, 5, 6 will contain a number of interesting features which will be new to our meetings.

Among the novelties will be a section of the Dr. W. H. Cushing Museum of the University of Southern California—loaned by Dr. Wm. Bebb—which will contain a large collection of abnormally shaped teeth and pieces of operative procedure. Some of these pieces are very ingenious in manufacture and will be most interesting to examine.



The Curator of the R.C.D.S. Museum will have this exhibit in charge, and he would be pleased if any of the members of the profession who has anything which would help to make our museum of more interest, would bring the specimens to the convention.

There must be a large number of pieces of operative procedure and odd-shaped teeth throughout the Province, and if collected and properly arranged would form a museum of good proportions.

A dental museum is composed of old instruments and utensils used in the laboratory. Specimens of operative procedure, teeth with very crooked roots, supernumerary teeth, very large teeth, large chunks of calcs deposit, enamel drops, dichotomes, fused teeth with gemmae, odontomes, abrasions, casts of atrophied teeth, erosions or cleft palate.

Doctor, be sure and bring something along with you.

DENTAL CARIES AND ITS PREVENTION.

A. E. WEBSTER, M.D., D.D.S., L.D.S.

Delivered before the Middlesex Dental Society.

Dental caries is a disease of mankind only. It is widespread. It is more prevalent in childhood and young adult life than at any other period. It is found in all races and all climates. It is most prevalent in temperate zones. Its prevalence can be shown to correspond to the so-called advances in civilization. It is essentially a dietetic disease.

Before such an audience as this it is quite unnecessary to discuss the essential cause of dental caries. I mean the bacterial cause as set forth by Miller. The work of Miller, Black, Williams and many others has settled for all time the pathology of dental caries. The work of Miller has done much towards the treatment of dental caries, but little of practical value in preventing the beginning of the disease. Dental caries is more prevalent to-day than when he made his discoveries. Both Black and Williams would seem to have done more towards the prevention of caries than Miller himself, because if our present prophylactic measures have any value in preventing caries it must be because we remove the dental plaque by friction. But strange as it may seem, Black has little faith in preventing decay of the teeth by the so-called prophylaxis in vogue, and D. D. Smith, the father of friction prophylaxis, does not admit that his success in preventing caries is due to the removal of the plaques. It must be kept in mind that Miller and many others do not admit that the plaque is essential to the beginning of dental caries even on smooth surfaces of the teeth.

It must be admitted by everyone who has thought of the matter at all seriously, that all the people cannot have their teeth treated sufficiently often to prevent dental caries. It is equally clear that prophylaxis performed by the public is a very imperfect means of preventing dental caries, however valuable it may be for other reasons.

It has been shown that dental caries is much more prevalent to-day than at any other time in the history of the race. And there is no doubt that there is more brushing, polishing and medication of the teeth to-day than at any other time. Although tooth pastes, tooth powders and mouth washes have been used for thousands of years, teeth have decayed more and more as years have gone by. With all our knowledge of the pathology of dental caries and our brushing, polishing and medicating and our boasted advances in dental science and art teeth decay in thousands to-day as compared with hundreds a few centuries ago or as compared to-day with some of the native races. Decay of the teeth like many another disease is treated when it occurs and little is done to prevent it. If dental caries is to be coped with at all it must be by methods far different from those now in vogue.

There are two essential factors in the attacking forces of dental caries. (1) Acid forming micro-organisms of the mouth, and the presence of. (2) Fermentable carbohydrates.

Inasmuch as all persons having present both these factors are not equally susceptible there must be some other elements which enter into the cause of the disease. The phenomena are profoundly modified by a number of factors, such as the number and character of the organisms present and the quantity of carbohydrate present. The alkalinity and diastatic action of the saliva, the resistance of the enamel surface, the shape and development of the teeth and their distribution in the jaws. In fact the disease is not the effect of a single cause, but is the resultant of several forces acting in one general direction.

Mr. Pickeral points out in a recent book that the anatomical form of the teeth of the highly civilized races is different from that of the native races. The enamel is thicker on the approximal surfaces, which decreases the spaces between the teeth, thus lessening the opportunity for the lodgement of fermentable carbohydrates. He has also found that the surfaces of the enamel in the civilized are not so smooth, hard and glistening as the native. There are wavy lines, slight fissures and checks to be found, especially on the approximal surfaces. Dr. J. B. Willmott has often said that one of the chief causes of decay of enamel was because of some defect of structure. The work of Pickeral in a measure substantiates the observation of Dr. Willmott. These roughened and defective surfaces make suitable lodging places for fermentable substances. The same author has found that all enamel is not equally dense or of equal hardness on the surface or equally soluble in acids. A peculiar observation is that the outer surface of enamel is permeable to fluids, but not the inner layers, and that the dentine is permeable. These observations are in accord with what has been found out clinically. Enamel when intact may be stained as by colored tooth preparations, tobacco, or the bedel nut, but the dentine is not affected. As soon, however, as the enamel is worn through, the dentine becomes stained. It has been noted that if any dentine is exposed a tooth will not remain bleached. There is an impermeable layer of enamel next to the dentine. Anatomically the native enamel is smoother, harder, denser, less soluble in acids, less permeable and less subject to superficial defects, and is therefore more resistant to dental caries. In order to obtain enamel of the highest resistance to caries it is necessary to promote those conditions hygienic, dietetic and prophylactic which will insure the normal development of the enamel organ.

Having spoken of the physical features of the enamel which make them resistant or susceptible to caries the saliva might well be considered at some length. It is generally believed that there is in the normal saliva some force or substances which act as a resistance to dental caries. A saliva which is active and abundant is less

liable to fermentation than a stagnant one. It is also shown that the resting saliva is vastly different from the active saliva. In fact the composition and quantity of the saliva are never constant even in the same persons. The composition depends upon the stimulant which caused it to flow. That saliva is brought forth which is most suited to digest that which stimulated its flow. Those substances which induce the flow of a large quantity of alkaline saliva at the time of stimulation and afterwards are most likely to prevent fermentation in the mouth and prevent dental caries. Experimentally it has been shown that natural fruit and vegetable acids induce an abundant flow of alkaline saliva, while starches and sugars inhibit an alkaline flow. Sugars and starches, besides being sticky and tenacious, tend to induce a viscid saliva. It is well, however, that singers will not eat candy or sweets previous to an engagement, because it causes a flow of thick tenacious saliva and mucous.

Some substances do not stimulate the saliva to flow, but rather retard it. Among these are biscuits, soft bread, oil of cloves, tannic acid, bicarbonate of soda and many like substances. In fact most alkalies retard salivary secretion. An acid diet largely made up of fruits and vegetables has raised the alkalinity from a normal index of 1.73 to 4.81 in twelve days. Besides increasing the amount of saliva during mastication it also increases to a marked degree the quantity and the alkalinity of the resting saliva.

It has also been shown that an acid diet increases the ptyalin. Sulphocyanate of potassium is also a protective agent against decay. It cannot but be a fact that the normal saliva contains all the necessary protective agents and is a perfect mouth wash. The fact that its quantity and composition are under perfect control points the way to a dental therapeutics of more value to the public than amalgam or the gold inlay.

FOODS AND DECAY IN DIFFERENT RACES.

It has been shown by the examination of the skulls of those people who died thousands of years ago that the jaws and teeth were larger and more firmly set. There was less decay and fewer of the consequences of dental caries than to-day. It has also been shown that the same races have not always been equally attacked by caries. E. G., Eskimaux.

It is a notable fact that the teeth of the Romans who inhabited England had more tooth decay than their predecessors, the Britons, or their successors, the Saxons. Those people who live as natives in very warm or very cold countries do not have as much dental caries as those in temperate zones. The teeth of immune races are found to be much more worn than the civilized. Dental caries increases with modern civilization.

The chief difference between civilized and uncivilized races is one of diet. Native races eat largely of natural fruits, vegetables and meats. All of which are either salivary stimulants or are low in acid potential. Besides, these require much mastication and are

not tenacious: two of the most important elements in the prevention of dental caries. It has been shown beyond question that there is solids as meat, pudding and pie, potato, bread and butter, biscuit and bread consumed, and the prevalence of dental caries. Look at the diet of the rising generations. Mr. Pickeral inquired into the daily diet of 1,500 school children and found it to be of a decided salivary depressent character and very high in acid potential. Such solids as meat, pudding and pie potato, bread and butter, biscuit and cake, jam and eggs; fluids of tea, milk, cocoa, water and coffee. Every practitioner before me knows that sugars and starches have a marked influence on the beginning of dental caries. Dr. Sim Wallace states that neither of his children has decayed teeth. Besides this he reports a class of 15 children whose diet has been under his control and practically stopped dental caries in their mouths. Dr. Kirk says that not one of his children has had a decayed tooth while they were in his household. In my own experience I have had the care of a family of three girls, ages 9, 11, 13 years; the youngest has many decayed teeth, the eldest also has decays, many in both permanent and temporary teeth. While the middle child has not yet developed a cavity. Upon inquiry I find the eldest and youngest children eat much candy, cake, biscuit and tea, while the other child, as the mother says, is peculiar about her diet, she eats largely meats, fruits and vegetables. I could cite many such cases in illustration.

Mastication as a factor in the prevention of dental caries has been previously suggested. I wish now to say that it is only second in importance to the foods taken. In fact the two go hand in hand, because the mastication of the foods themselves is the most important factor in cleaning the teeth. Coarse, fibrous foods, besides scrubbing the surfaces of the teeth in mastication, stimulate an abundant flow of saliva. In this connection dentists have noted how rapidly the teeth of inmates of institutions decay. As nurses in hospitals, girls in boarding schools, etc. They are served with a diet, mostly of starch and sugar, and of a character requiring little if any mastication. Besides this girls so confined look for something to do and are allowed to entertain themselves eating largely candy, tea and sweetmeats.

All other things being equal finely divided starch produces more lactic acid than any other article of diet. Cane sugar is really low in acid potential as compared with many other forms of sugar. The order of acid potential is pastry, white bread, toast, brown bread, chocolate, biscuit, apple, potato, bread and butter, crust of bread, parsnip, orange, salad, cane sugar, rice, meat. The acid produced attacks enamel in this same order. It must be born in mind that some of these substances are very high as alkaline salivary stimulants, and would thus counteract the acid production. All substances which were originally acid or are acid in reaction are beneficial in the prevention of decay, e.g., potato, lemon, parsnips,

pineapple, banana, apple, orange, meats, fish and fowl. A meal may be so arranged that if the carbohydrate element is followed by one of the above there will be sufficient alkaline saliva produced to overcome the baneful effects of the carbohydrate. A sequence is better than a mixture.

"In order to prevent the retention of fermentable carbohydrate on and between the teeth and so eliminate and very considerably reduce the carbohydrate factor in the production of caries, starches and sugars should on no account ever be eaten alone, but should in all cases either be combined with a substance having a distinctly acid taste, or they should be followed by such substances as have been shown to have an 'alkaline potential' and the best of these are undoubtedly the natural fruit and vegetable acids."

A meal should begin with an acid and finish with an acid. A meal begun with a salivary stimulant, such as oranges, lemon, olives and finished with an apple, which is a marked detergent, as well as a salivary stimulant may be filled in between with starches and sugars to a certain degree without harm to the teeth.

A meal closed with tea and cake is the worst possible combination for the teeth. Such pastry flour is finely ground and tenacious, with a high acid potential, and the tea always containing some tannin is a salivary depressant, the sugar adding to the difficulty. Such a meal at bedtime is common in some families.

It has been shown that cane sugar is the least harmful of all forms of sugar, but unfortunately it is the most expensive. For this reason alone few of the candies on sale are made from cane sugar. Most candies contain large proportions of glucose and starch, two of the very worst substances for the teeth and digestion. It has been said by careful investigators that the candy eater of youth is the drunkard of later years.

A suggestion is made by Pickeral that all candy and fancy pastry factories should be placed in the same class as breweries and distilleries. An excise should be collected upon their products, and the money so collected should be used to reduce the cost of vegetables and fruits. They should be looked upon as harmful luxuries.

If ever the universal decay of the human teeth is to be checked it must be by some means that all the people may apply. All the people cannot have the services of a dentist. Less than 25% of the people of Ontario ever visit a dentist. All the people can apply dietetic means of preventing decay and apply prophylactic methods e.g., wrinsing, brushing and masticating. Naturally you expect me to say something about mouth washes, tooth pastes, tooth powder and tooth brushes and brushing as means of preventing caries.

The beneficial effects of these methods of preventing dental caries has not at all kept pace with the increase of decay.

**SCHOOL CHILDREN'S TEETH, THEIR UNIVERSALLY
UNHEALTHY AND NEGLECTED CONDITION.**

J. G. ADAMS, L.D.S., TORONTO.

(Continued from page 171, April number.)

"Now, I think you will admit that the history of this neglected tooth is unique indeed. My object in giving it is that we may draw lessons from it which, I trust, will be of use to the children of our schools, and will prove to you *that it does make a great difference* to you whether your neighbors take care of their children's teeth or not. My first point is this: If it was dangerous (and it was settled by law that it was) to have a child sitting in the school with an abscess discharging pus on the outside of his face, though it was where it could be seen and avoided, how much



MR. FRED GEE
28 years of age

greater must be the danger your children, and all the children of this Dominion of Canada, are in when I tell you that in every school there are many children, not with one abscess, but with

many abscesses, not on the outside of the face, where they can be seen and avoided, like Fred's, but concealed in the mouths of outwardly clean and well-dressed children, like your own. In the mouths of these children I have seen large quantities of vile, poisonous pus, from their dead, abscessed teeth and roots, which is continually gathering and discharging in their mouths every time they take cold. This they frequently spit on the floor, to dry up and mix with the air of the room for your children to breathe. There are thousands of such children in the well-to-do schools in Toronto, the condition of whose teeth is a disgrace to a city claiming to be civilized!

"The principal of one of our best schools told me that there were many such children in his school belonging to wealthy families, but that he did not dare to say anything to them for fear of giving offence, adding, however, that he always tried to keep as far from them as possible, as their breath was so vile. Other teachers have told me the same thing, and thanked me for the effort I was making to bring about a reform; so you see it is not from the condition of the poor only that your children are in danger.

"This cut of Mr. Fred Gee, now twenty-eight years of age, speaks for itself. He is a living witness to the serious blunder made



HARRY STEINBURG

A CASE OF MISTAKEN DIAGNOSIS BOTH BY THE PHYSICIANS OF
THE TORONTO GENERAL AND THE SICK CHILDREN'S HOSPITAL.

by the City Medical Health Officer in his diagnosis of his case. One might make some little excuse for his first mistake, but there can be no excuse whatever for his persistent statement before that court as to its being a case of tuberculosis, and that, too, in the face of what Dr. Noble said as to Fred's cure by the simple extraction of an abscessed tooth. Fred is a living witness also to the unjust decision by the judge, he refusing to allow the case to go to the jury when requested so to do by Mr. Duvernet, Mr. Gee's lawyer. Is it any wonder that Mr. Fred Gee often feels angry when he thinks of the heavy loss he has sustained in education by being forced to remain out of school that year and a half? He said he can never get as good a position or as good wages as he could if he had a better education."

"This child, Harry Steinburg, was sent to me from the Elizabeth Street School, with his head bandaged as you see. I examined his face and found an abscess which was discharging pus. The careful way the boy's face had been bandaged showed plainly that it had been done by an experienced nurse, not by his mother. So I went back to the school to get the history of the case. There I was told he was an out-door patient of the Sick Children's Hospital; I then took him there. The doctor said they had been treating him for three weeks, dressing the abscess and giving him systemic treatment. They evidently had no idea that the trouble was caused by a tooth, or they would have removed it or sent him to a dentist or the Dental College. How much longer their treatment would have continued and the boy have gone to school with his face bandaged, if he had not been sent to me, I do not know; it is certain it would have continued for years unless the tooth was taken out.

"The teacher of the Elizabeth Street School received a letter from the boy's father, dated Toronto, Nov. 12th, 1911, in which he said his son had suffered with this abscess for nearly a year, beginning in the old country. After coming to Toronto he took him to the General Hospital. The doctor there, in addition to giving him medicine internally and externally, tied his mouth up with a cloth to keep out the cold. Not getting any better, he was taken to the Sick Children's Hospital. There, they did the same thing. 'On Sunday, November 12th, it was swollen inside and outside. We went to the doctor's and they don't know what the trouble is with it, so we ask you to kindly write a letter to some other Hospital and see if they need to keep him in the hospital until he is well, if so, let us know.' (Signed) PHILIP STEINBURG.

"If the treatment in another hospital had been the same as in the General and Sick Children's Hospital, he would have had to remain there for years. Providentially for the boy, however, he was sent to me. I took him to the Dental College. The professors there agreed with me that it was a case of alveolar abscess caused by a dead tooth. They kindly gave him gas and extracted the abscessed tooth and some other teeth that required removing. In one week his face healed and he was able to go to school all right without bandages."



HARRY STEINBURG

This photo was taken six weeks after the abscessed tooth was extracted. Note the difference between the two portraits. He no longer requires the hospital bandages, and there is a marked improvement in his health and general appearance, even in this short time.

MEDICAL STUDENTS OF 1912 NOT RECEIVING THE INSTRUCTION THEY SHOULD ON THE IMPORTANT FUNCTIONS OF THE TEETH.

"I am pleased to give this extract from Dr. Caven's very interesting paper, not only because it shows that I have not over-estimated the case as to physicians not taking the teeth into consideration as much as they should in many cases, but more because it shows that there is an awakening on this subject among some of them. What, however, about the medical students of 1912? This morning, Jan. 10th, 1912, I called on Dr. Primrose, secretary of the Toronto Medical Faculty, to enquire as to what lectures were being given to the medical students on the teeth and the effects neglected teeth had on the general system.

"He said he was sorry to say there were no such lectures given.

"He said that a year ago members of the dental profession had suggested that such lectures be given, but as yet nothing had come of it.

"The medical profession on this continent during the past quarter of a century, have made great strides in many respects, still, surely, the many serious cases I have given of mistaken diagnosis by prominent physicians in a university city like Toronto, indicates a great need for a move on by the profession in this respect. 'Preventive Medicine' should be the ideal of such a profession."

Proceedings of Dental Societies

THE EASTERN ONTARIO DENTAL ASSOCIATION.

The Eastern Ontario Dental Association held its annual meeting at Ottawa, May 1st, 2nd and 3rd, 1912. The attendance was good, the interest keen and the programme varied. During the first session there was a discussion of the affairs of the association, and especially the representation from District No. 1 on the Board of Directors of the Royal College of Dental Surgeons. The sitting member, Dr. Robertson, wished to retire and suggested the name of his successor. The association in days gone by used to name a candidate for election, but on this occasion no name was sanctioned. It was held that a retiring member's suggestion of a successor might not always be acceptable to a constituency, so no action was taken.



Members of the Eastern Ontario Dental Association, Ottawa, 1912.

The President's Address contained much controaversal matter, Several members strongly objected to the Board taking any action which would lessen its powers. In this matter there seemed to be a misunderstanding of the facts under discussion. However, it was later made clear.

Dr. Watt, of Ottawa, read a very interesting paper on physical diagnosis, the discussion of which was keen with many diverse views expressed.

Dr. Doherty's address on some aspects of the oral hygiene movement was a most interesting subject. Members of the School Inspector's Staff and of the School Board were present and took part in the discussion. Dr. Leggo, in discussion, said that the dentists of Ottawa were giving a half day each month to attend to the teeth of the poor at the General Hospital, where a room is fitted up for the purpose. This work is largely for educational purposes. The Ottawa dentists are doing a noble work in dental educational lines.

Following Dr. Doherty's paper was one by Dr. Webster on "Some Recent Views on Dental Caries." This paper was well discussed.

In the evening the banqueting hall of the hotel was laid for over a hundred guests. The ladies and friends of the association were present to enjoy the evening.

Dr. Hanna and Dr. Davy presented two interesting papers the following morning.

The officers elected were

President, A. T. Morrow, Maxville.

Vice-President, W. C. McCartney, Ottawa.

Sec.-Treas., R. M. Armstrong, Ottawa.

Reviews

Principles and Methods of Orthodontics. An Introductory Study of the Art for Students and Practitioners of Dentistry. By B. E. LISCHER, D.M.D., Professor of Orthodontics, Washington University Dental School; Member of the American Society of Orthodontists; author of "Elements of Orthodontia," etc. 12mo, 258 pages, with 248 illustrations. Cloth, \$2.75, net. Lea & Febiger, Publishers, Philadelphia and New York, 1912.

Malformations of the jaws and misplacements of the teeth are so common that they enter into the practice of every dentist, and from the standpoint of the patient they are so disfiguring, and so great an interference with the functions of the mouth in eating and speaking that they demand correction. The very necessity of such cases has stimulated research and ingenuity in their behalf, and hence orthodontics has reached a high degree of development and success. Professor Lischer is qualified to present his subject with the highest authority. His purpose in writing this manual has been to provide students and dentists with a guide to the principles and practice of orthodontics, simply written, clear and yet full in detail. He has furnished abundant illustrations showing conditions, methods of treatment and results. The volume affords in convenient form a concise and practical exposition of the subject in its most advanced development.

(EDITOR.—The few selections below will give the reader a fair idea of the value of the work.)

THE ETIOLOGY OF MALOCCLUSION.

Heredity and Predisposition.—Of course, there was a time when heredity explained it all, when it served as a cloak for our ignorance; when most diseases and abnormalities were believed to have transmitted from parents to offspring. But the physical basis of heredity (a mechanism existing within the germ cell) is now fairly well established. Many of the recent advances in biology have fostered a strong opposition to the old views, forcibly emphasizing the influence of environmental (acquired) factors, which cannot be ignored. "As to the inheritance of the effects of extrinsic forces upon the individual, we find little in the way of direct evidence. Mutilations of any sort are not inherited." (Jordan and Kellogg.) This new teaching, it must be admitted, has served as a healthy antidote; it was needed.

On the other hand, the claim of the opponents of heredity—"that nature never transmits the abnormal," that all anomalies are but the result of certain lapses in nature's processes, always due to local and extraneous influences—is equally untenable. In the light of modern biological science either view is now considered extreme.

Unfortunately, in these days of the "systems," with their truly

wonderful achievements in technique, we are prone to rest content with our superficial calculations—for we love to cling to seeming bounds. But accepting, as we must, the physiochemical explanation of life, we are constrained to adopt those causomechanical factors of its flux which are recognized by biologists generally, and which “involve no philosophical assumptions.” These are heredity, variation, adaptation, selection, isolation, and (probably) mutation. With the first of these we are here briefly concerned.”

Heredity may be defined as “the genetic relation between successive generations, as the transference of similar characters from one generation of organisms to another, as a process affected by means of the germ cells.” All peculiarities or characteristics that are imparted to an individual through these germinal cells of the parents are spoken of as inherited. Any peculiarity that is imparted after conception has taken place is spoken of as acquired. If before birth, it is termed an intra-uterine acquisition.

All inherited peculiarities are also said to be congenital, whether recognizable at birth or not. Likewise all intra-uterine acquisitions are congenital; whereas extra-uterine acquisitions are spoken of as extra-genital. The careless use of the term congenital (many writers believing it to be synonymous with heredity has been the cause of much confusion.

Concerning predispositions, Professor Orth, of Berlin, says: “Every incapacity of the body to resist the external causes of disease, every peculiarity of the constitution which renders the latter unable in the struggle of the body with the cause of disease to maintain the normal course of the vital phenomena, every such peculiarity of the constitution may be designated as a tendency, as a predisposition, to disease. All these predispositions to disease must be congenital and inherited, for they are a result of the phylogenetic development; they have their origin in the general characteristics inherent in the germ cells. This conception of what constitutes predisposition to disease does not contain anything mystical; it is not beyond the domain of science, and is just as capable of scientific treatment as any other pathogenetic question, though we must admit that our knowledge of the predispositions to disease does not go much beyond a few generalities.”

Heredity, therefore, is not as definite a factor as formerly, though we must continue to regard it as of great importance in the study of organic continuity. “Heredity repeats strength or weakness, good or ill, with like indifference.” (Jordan and Kellogg.) Furthermore, one phase of this vast theme stands out very prominently, viz., all dental research relative thereto, and thus far conducted, is entirely inadequate. For this reason alone we should pause long before boldly denying its probable “influence” in the causation of malocclusion of the teeth. Another very plausible reason why we should be less hasty in excluding the hereditary factors is that many anomalies of other organs of the body (notably the

eyes, *e.g.*, errors of refraction, imbalance of the ocular muscles, etc.) are largely congenital and frequently transmitted from generation to generation. Surely the teeth and jaws are not exempt from the "influences" which control such maldevelopments.

"Our present plight seems to be exactly this: we cannot explain to any general satisfaction" all the causes of malocclusion of the teeth without the help of some hereditary factors; "and on the other hand we cannot assume the actuality of any such factor in the light of our present knowledge of heredity." In view of this very unsettled state of our knowledge the author has, for some years past, preferred the terms intrinsic and extrinsic, instead of hereditary and acquired.

Intrinsic Factors.—Several anomalies of dentition, and sundry constitutional peculiarities, causing malocclusion of the teeth, are due to certain inherent, systemic influences. We term these the intrinsic factors; some of them being congenital, and probably inherited, others not.

Anomalies of Number.—These are found in both the temporary and permanent series, and frequently stand in causal relation to a malocclusion. Thus there may exist a deficiency in the number of teeth, which permits the adjoining members to migrate into abnormal positions. When more than twenty teeth appear in the temporary dentition, or more than thirty-two in the permanent, we term it redundancy. This may lead to a crowded arrangement of them in their respective arches.

According to Busch, there are three kinds of supernumerary teeth: (a) Those with conical crowns and roots; (b) tubercles; and (c) supplemental teeth, and those of normal form (Hollander). Premature extraction of a temporary tooth, or other traumatic influence, might occasionally be responsible for a deficiency in the permanent set, but it is obvious that most anomalies of number are not due to extraneous causes. Atavism has long been regarded as a cause of redundancy; and more recently their budding off from the common dental lamina has been suggested as a probable explanation of supernumerary teeth. But according to Tomes, "our present knowledge of the subject will not enable us to recognize the cause which has produced" anomalies in the number of teeth, though syphilis, rickets and other maladies have frequently been mentioned.

McQuillen, Tomes and many other investigators have recorded numerous cases where anomalies of number were transmitted through several generations of the same family. Frequently the history of such cases are so vitiated by premature loss of teeth, *i.e.*, by caries and extraction, that they are of little value. Yet it is undoubtedly true that, in most cases, they are congenital and therefore transmissible.

Anomalies of Form.—Though rarely met with, anomalies of form occasionally enter into a malocclusion, and they suggest interesting morphological questions. They may express themselves in

various ways, *e.g.*, deficiency, redundancy, dichotomes, etc. When affecting the anterior teeth they usually present a disfigurement, and frequently cause malocclusion of the adjoining teeth.

Abnormal Frenum Labiam.—Occasionally cases present themselves with an abnormal space (diastema) between the central incisors. In the upper arch it is usually due to an excessive development of the frenum of the lip. The fibers of this muscular attachment are of sufficient density, and its movements so constant, that it prevents the teeth from coming into normal contact.

This factor is usually classified as an acquired cause, or as a "local" cause, but the author is fully convinced that this is an error. Clinical experience uniformly tends to show that in all cases brought under early observation the same abnormal conditions exist during the period of the temporary dentition. Weidersheim has shown that the raphe and papilla palatina are more highly developed in the embryo and during early infancy than in later life. This papilla has been investigated by Merkel, who found it to be a sensory organ, and that it probably assists the palatine ridges in the trituration of food. Wiedersheim has also offered the suggestion that the raphe is "the remains of palatal teeth handed down even to man."

In the absence of any authentic cases showing that an abnormal frenum is due to extraneous influences, we are constrained to regard it as an evidence of faulty development during embryonic life. Atavism suggests itself as a probable cause of such faulty development; but whatever the cause, it is plain that it is intrinsic. Ketcham's extended investigations with the X-rays conclusively demonstrate that maldevelopments are in no wise related to an opening of the maxillary suture.

Asymetry of the Jaws.—The jaws, or foundation structures upon which the teeth and their alveolar processes are placed, may, according to Talbot, be malformed in approximately 30 per cent. of apparently normal individuals. It is clear that if these structures are inharmoniously developed to any considerable degree, the superimposed teeth are very apt, upon closure, to come into malocclusion. Both the upper and lower jaw may be thus affected, and while many arrests of development are traceable to abnormal occlusion, and therefore abnormal function (which speedily corrects itself after orthodontic treatment), there are rare instances which cannot be so easily disposed of. The causes of such developmental disturbances are not well understood.

Premature Loss of Temporary Teeth.—The necessity for the conservation of the temporary teeth during their allotted period is a truth that is gaining wide acceptance. The cumulative evidence of the disastrous results following their early loss through promiscuous extraction, or neglected progressive caries, is becoming a sufficient argument to all conscientious practitioners. Premature loss and pulp exposure due to neglected caries tend seriously to interfere

with normal function; and in the development of the denture and its related structures normal function plays the leading role. Furthermore, the loss of a single tooth, or even of a part of a tooth, produces a break in the continuity of the arch and permits abnormal movements of the adjacent teeth.

Premature Loss of Permanent Teeth.—The early loss of permanent teeth, especially of the first molars, is now regarded as an established etiological factor of malocclusion. In action it is similar to the loss of temporary teeth as described above, and is very frequently accompanied by a deepening of the "bite" or a destruction of the normal plane of occlusion.

Prolonged Retention of Temporary Teeth.—The prolonged retention of temporary teeth, should they persist long after the need which occasioned them has ceased, is another prolific factor in the causation of malocclusion. An erupting tooth is suspended, as it were, by its soft attachment tissues, and the slightest pressure, if it be constant, is sufficient to deflect it in its course. The orifice through which a tooth passes on its journey of eruption is greatly enlarged by the absorption of the crypt walls. Of course, we have our eruption tables, but many teeth deviate from the averages there set forth; and clinical observation teaches us that there is an opportune time for the exfoliation of each temporary tooth. The operator should, therefore, exercise judgment in every case of removal of temporary teeth.

Nasal Obstruction.—The importance of normal respiration and of a rational nasal hygiene, particularly during the developmental period, can hardly be over estimated. "Obstruction of the free passage of air through the nose is one of the most frequent and important consequences of the nasal disease. The obstruction may be partial or complete, periodical or constant. When chronic nasal obstruction occurs at an early age, it exercises deleterious effects on the neighboring parts, on the general well-being, and on the development and growth of the whole body. The full consequences of nasal obstruction are most frequently seen in children suffering from adenoids." It may be due to one or more of the following anomalous conditions: (a) Adenoids, (b) deformities of the septum, (c) hypertrophies of the turbinates, and (d) nasal polypus. Another condition frequently met with, and very often associated with lymphoid hyperplasia of the nasopharynx, is hypertrophy of the tonsils, constituting an hypertrophy which includes what has been called the "lymphoid ring," or "ring of Waldeyer."

The more important direct effects of nasal obstruction Lack places as follows: Loss of nasal function, the open mouth and its mechanical consequences, deficient oxygenation of the blood, and deformity of the chest walls. The symptoms due to a constantly open mouth, and which especially appeal to the orthodontist, he enumerates thus: The typical facies, malformation of the jaws, malposition of the teeth, and collapse of the alae nasi.

"Thus most observers agree that the deformities in question are frequently, if not invariably, associated with mouth-breathing. Ziem's experiments demonstrate conclusively that they may result from it. He obstructed the nostrils of puppies and other young animals, and found that great deformity of the bones of the face resulted in later life. There seems every reason to believe that nasal obstruction precedes and causes the facial deformity. The latter is never congenital, but it follows after years of mouth-breathing; the changes can be arrested, and will even retrogress, if the cause be removed."

Vertical and mesial malrelations of the lower dental arch, and malformation of the mandible are frequently associated with mouth-breathing. Case suggested the latter as a cause, and that hypertrophy of the tonsils frequently stands in causal relation to them.

But the subject of nasal obstruction is a vast one, forming a large part of the field of rhinology, and it would carry us far beyond the confines of the present chapter to attempt a detailed treatment of it. For further study, the student is referred to text-books on diseases of the nose and throat.

Habits.—Another rather fruitful cause of malocclusion are sundry habits of childhood. Foremost among these may be mentioned the habits of thumb and tongue sucking, and that of lip biting. The first is probably the most common, and frequently hardest to discontinue. They are usually acquired during infancy, when the parents or nurse regard them as harmless, or even pleasing. But when we reflect on the mechanics of maxillary development, on the ease with which growing tissues are moulded into form, and on the constancy of these subtle influences, we readily appreciate their gravity and source of harm when continued for a long period.

Some writers have classified mouth-breathing as a habit, though it is obvious that it is but a symptom of pathological conditions of the respiratory tract. Herbst also mentions the probable influence of the following, which are frequently overlooked: The use of pacifiers during infancy, the sucking of cheeks, the biting of the upper lip in mesiocclusion of the lower arch, resting the cheeks upon the hands, resting the chin upon the hands, and sleeping on one side. According to the author, Peckert has suggested the biting of cigar tips as practised by cigarmakers; Palltorf the biting of threads among seamstresses: the playing of musical instruments like the flute, etc., and the artificial deformities of the teeth as practised by many primitive races (Schroder), as causing deformities of secondary importance.

Disuse and Artificial Nursing.—Disuse of the dental organs during childhood or the developmental period, and the artificial nursing of infancy, are frequently mentioned as causes of arrested development of the maxillae and their processes. The modern methods of cooking food and neglected caries are also said to be largely responsible for the prevalent practise of improper mastication.

In his study on the mechanical formation of the denture, Korbitz has carefully analyzed such influences as active muscular pressure, the passive pressure of the soft parts, atmospheric pressure, pressure of the adhering tongues, as noted by Cryer; the functional influence of occlusion, etc., all of which are minimized, or even perverted, in cases where the above-mentioned factors are operative.

THE EVOLUTION OF METHODS IN ORTHODONTICS—
METHODS OF THE PAST.

Scientific progress during the last half-century has so altered our conceptions regarding the theory of life and the growth of society that we are forced to re-write history and adapt it to the evolutionary philosophy (Pearson). Present-day standards require history to be more than antiquarian; the real profit in tracing the development of an art must rest in something else than a mere knowledge of what has happened in chronological order; it must dwell in an understanding of the principles that have promoted the developments of the past, in the meaning of certain events. This advance in our conceptions is due to the epoch-making labors of Darwin, "who made all reasoning since his day follow his method."

Now, in tracing the evolution of orthodontics the aim should be to view its development from the standpoint of this new and higher perspective. In no other division of its subject matter is this more desirable than in the methods of the treatment. Not that the tracing of its remedial measures constitutes the whole of its history; the evolution of the science and the history of its theoretical foundations are equally important. But a greater unanimity of opinion regarding these fundamentals has always existed. Indeed, the principles of the science are readily traced; in these fields a greater harmony prevails than a first survey seems to justify. Not so with art. The steep acclivity up which we have so slowly traveled measures a progress not without interest or strife. The desire of supremacy on the part of several of our leaders has added its bitterness as well as charm.

The delineation of the methods of treatment is difficult not only because they have been as varied as could well be imagined, but because they comprise an overwhelming mass of trivial details. Formerly the dentist only occasionally dabbled in matters orthodontic, and thus failed to grasp the principles underlying the technical details of treatment. Prior to diagnostic systems, each case constituted a class by itself, so that the designing and constructing of a mechanism for treatment often taxed to the utmost the inventive capacities of the practitioner. Thus the birth of the new order was painfully prolonged, and the rudiments of present-day methods unwittingly obscured.

But in 1878 Dr. Farrar, of New York, prophesied lines of advance which have since been followed with increasing advantage and favor. The import of his prediction was not really grasped,

though it stipulated the standardization of appliances and their being carried in stock by dealers. Indeed, this ideal is not yet fully achieved, though its influence thus far has been nothing short of revolutionary. It has forever relegated appliance manufacture where it rightly belongs, has freed the mind of the operator of many petty details, and furnished the necessary leisure for the investigation of more important matters.

Viewed in this wise, it is not difficult to imagine the probable present status of a department like operative dentistry had not the manufacturer long ago come to the rescue. The wonder of it, then, is not how little, but how much the past has achieved. Truly, a sincere review of the work of the pioneers and pathfinders awakens the deepest reverence; their labors must ever be regarded as indispensable stepping stones. Though they are not fading from twilight into dusk, let us not forget that they ushered in that golden dawn which made the present possible.

RISE OF THE SYSTEMS.

Following the epoch-making labors of Farrar, the introduction of stock appliances was inevitable. The wholesale construction of standard mechanisms with interchangeable parts, to be placed upon the market for sale, was now demanded. Naturally, many of the earlier efforts in this direction were very incomplete and unsatisfactory, and in untrained hands often proved a failure. They were usually brought forth in the shape of a "system," and represented the more commonly used methods of their author.

In 1876, in response to these demands, Dr. Farrar offered duplicates of many of the appliances he had used in his practice. For a time they enjoyed an extended sale, but were soon displaced by devices of similar design, notably those by Patrick in the early 80's.

In 1887 Angle introduced a system which embodied sundry of these old principles, though greatly simplified by a reduction of parts.

Among the many other methods brought forward during this unusually productive period were the systems of Jackson, Case, Lukens and Knapp.

Recent adverse criticism has created considerable ill feeling in opposition to these so-called systems, which could easily have been avoided had their originators adhered to the principles of historical method. Their tacit claims of having suddenly, and by original methods, revolutionized the art and brought it to an approximate finality, are directly traceable to the wilful omission of the work of many predecessors.

LINES OF ADVANCE.

The comprehension of the importance of a differential diagnosis, the designing of a definite treatment for all cases belonging to a given class, and the simplification and mastery of the technical

details of every such definite treatment, may be said to constitute the core of what has been termed the new movement in orthodontic practice.

The systems (particularly the efforts of Angle) have been largely responsible for promoting this advance in our progress. And though they were unbecomingly dogmatic, they possessed the saving grace of showing the wide range of applicability of a limited claims was, after all, a very laudable one; by insisting on the mastery of a few essentials and their manifold combinations, orthodontics made a progress heretofore unattainable. In fine, to be a master in the application and use of a few appliances, rather than the slave of many, is a worthy lesson the systematists have tried to teach. Ever since the dawn of this tendency toward simplicity and the unification of methods, orthodontics has witnessed a wholesome elimination of many unnecessary and impracticable procedures. Though its process of elimination still continues, at the present writing it is very evident that certain mechanisms (those embodying advanced principles of design) are tending rapidly toward universal acceptance.

DETAILS OF DESIGN.

From the earliest times several of the noble metals, viz., gold, platinum, silver and their alloys have been used in the construction of regulating appliances. In recent years base metal alloys like German silver have been widely employed. Iron, steel, nickel, aluminum bronze and vulcanite rubber have all been recommended. German silver, however, possesses many of the virtues which should be embodied in an appliance, such as temper, adaptability when annealed, inexpensiveness, etc. On the other hand, Pullen and Grieves have recently called attention to its shortcomings, which are as follows: Discoloration and disintegration, and, occasionally, the formation of metallic stains upon the tooth surfaces.

Alloys of iridium and platinum, and of gold and platinum, are therefore preferred by many operators, because they are not affected by the acid fluids of the oral cavity, or by any of the medicaments employed in practice (such as hydrogen peroxide, solutions of silver nitrate, tincture of iodine, etc.).

When attention was first called to the corrosion of German silver its advocates proclaimed this a virtue, believing the consequent liberation of metallic salts had a favorable prophylactic influence, promoting an immunity to caries of the enamel. Grieves, on the other hand, had shown that the amount of metallic salts thus set free and swallowed by the patient frequently proves deleterious by unfavorably affecting the physiological action of the ptyalin and enzymes. He claims zinc is the most objectionable of all the metals which enter into alloys used for appliances.

The introduction of aluminum bronze into dentistry by Sauer, and its recent revival for regulating appliances by Treyman, resulting in the so-called "non-corrosive" appliances, will doubtless lead to the discovery of base-metal alloys with virtues equal to those of the noble metal group. The latter, however, possess all of the requisite qualifications except that of cost.

Dominion Dental Journal

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VOL. XXIV

TORONTO, MAY 15, 1912

No. 5

MEETING OF BOARD OF DIRECTORS OF THE ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

The regular annual meeting of the Board was held in the College Building, Toronto, April 29th to May 3rd. There was the regular business of the board transacted and a few changes made in policy. The licentiates' fee will be hereafter two dollars a year instead of one dollar as in the past. This is as it should be. In the past the fees of the profession have not been sufficient to defray the expenses of the board and the fees of the students had to be used for this purpose. Hereafter students will not be required to attend a summer session at the college or article with a preceptor. The Board will no longer appoint one of its members as a representative at the school to look after their interests. To carry this out, Dr. Secombe resigned from the Board and was appointed Superintendent of the school. The Board also, by resolution, made him a member of the Faculty Council. The resignation of Dr. Secombe from District No. 3 made it possible for the Board to appoint a

successor, which they did. Dr. C. A. Kennedy, Assistant Editor of *Oral Health*, was appointed. Unless there is a special meeting of the Board before the autumn he will not have an opportunity of taking his seat before the elections come off. Dr. Kennedy, who was Librarian of the school, resigned, and Dr. A. D. A. Mason was appointed.

Tom Jones, the janitor, who has lived outside the school for the past few years, will return to the building, and W. Jackson, the second janitor, will retire. There were other subjects discussed of great moment to the Board, and will, no doubt, appear in detail in the annual report.

DENTAL FACULTIES OF UNIVERSITIES.

In our last issue we were glad to announce the Faculty of Dentistry of Dalhousie University, Halifax. The members of the dental profession of Nova Scotia are to be congratulated upon having their dental college take a university position in so few years after its inauguration. The School of Dentistry of the Royal College of Dental Surgeons of Ontario is the only dental school in Canada not under the wing of a university. The time is rapidly coming in Ontario when the dental school will be forced into a mediocre position if it does not become a part of the provincial university. Only vested interests in the dental profession hinder overtures to the university. The general body of the profession is for it.

DR. JOHNSON'S LECTURE ON ORAL HYGIENE.

Dr. C. N. Johnson addressed the teachers, trustees and their friends of the Separate School Board of the City of Toronto, April 26th, on the subject of Oral Hygiene.

St. Mary's Hall, which holds upwards of a thousand people, was well filled. Unfortunately a great number of people went away, believing there was not sufficient room. A block of seats was held for teachers of one school, who failed to appear.

Dr. Johnson's lecture was given under the auspices of the Separate School Board, but the Canadian Oral Prophylactic Association paid all the expenses, the same as they did when Dr. Dowd was brought to Toronto to lecture to the teachers of the Public Schools. Following Dr. Dowd's lecture the Public Schools inaugurated dental inspection of the public school children.

It is hoped that the Separate School Board will take a similar step at this time. Dr. Johnson's lecture appears at page 187 of this issue.

In the evening Dr. Johnson addressed the members of the Toronto Dental Society and their friends on the same subject as the afternoon lecture. At the close of the meeting there were many expressions of appreciation of the lecture.

Toronto, May 2, 1912.

Dr. A. J. McDonagh,

Pres. Canadian Oral Prophylactic Ass'n., Ltd.,
City.

Permit me to convey in a special manner to you, Dr. Loftus, Dr. Day, and the other members of your Association, the sincere thanks of the Separate School Board of this city for the kind interest you have manifested in the welfare of the pupils of our schools.

The lecture recently given by Dr. Johnson on Oral Hygiene in St. Mary's Hall, under the auspices of your Association, was an able exposition of the subject, very interesting and instructive, and was highly appreciated, not only by the teachers, but by all who were present.

The proposed dental inspection of our schools, I am sure, will be of great advantage to the pupils from a mental and physical standpoint, and will be carried out as soon as the necessary arrangements can be made.

Again thanking you for your kindness and courtesy in this matter, I am, dear sir,

Yours very truly,

F. T. HALL, Assistant Sec.,

Separate School Board, Toronto.

Proceedings of Dental Societies

CANADIAN AND ONTARIO DENTAL ASSOCIATIONS.

PROGRAMME

MONDAY, JUNE 3.

10 to 1. Registration.

2 p.m. Mayor Lees' address of welcome to delegates. Presidents' addresses.

4 p.m. Thos. Hartzell, Minneapolis: "Pyorrhea Alveolaris, its etiology and treatment, with special reference to the Alveolus as a point of entry to constitutional infection."

Automobile drive around the city of Hamilton and Bay for ladies.

8 p.m. Four fifteen minute papers by leading Canadians. A. E. Webster, Toronto, Training for Dental nurses, "What they should know." J.G. O'Neill, Fort William, "Treatment of Children." C. A. Murray, Moncton, "Business possibilities for the Dentist." Combination of silicate cement and gold inlays."

TUESDAY, JUNE 4.

9 to 12. Clinics.

2 to 6. Huge picnic on the beautiful lawns of the Brant Hotel. Sports: Bowling, Soft Base Ball Tournament, Hamilton vs. Canada. Band and refreshments.

7 to 9. Business meeting, reports of committees. Canadian Association Educational Committee. Ontario Society Educational Com. Five minute report from each Province. Dominion Dental Council. Army and Navy Committee.

9.30 to 11.30. Moonlight on Steamer Macassa.

NOVA SCOTIA DENTAL ASSOCIATION.

The annual meeting of the Nova Scotia Dental Association will be held in Dalhousie University building, Halifax, Thursday and Friday, June 11th and 12th. The equipment of the dental department affords every facility for clinical demonstrations. A good programme is being arranged. Mark the dates off your appointment book now.

WM. W. WOODBURY,

Secretary.

WEDNESDAY, JUNE 5.

9 to 12. Clinics.

2 p.m. W. G. H. Logan, Chicago, "Illustrated lecture on "Diagnosis and Treatment of Carries Necrosis, and Fractures of Jaws."

4 p.m. Geo. W. Grieve, Toronto, "Orthodontia for the general practitioner."

8 p.m. Informal Dance, in ball room of Brant Hotel.

THURSDAY, JUNE 6.

9 a.m. Hart A. Goslee, Chicago, "Newer Methods in Crown and Bridge Work."

RAILWAY RATES.

Single fare standard certificate plan.

Delegates west of Winnipeg may stop off at Winnipeg Western Dental Meeting. If C. P. R., buy ticket to Toronto, then G.T. R. to Burlington, or C.P.R. to Hamilton, and change to radial.

HOTEL RATES.

Brant House: \$2.00 per day (American) two in room, \$2.50 with bath. Stroud Hotel: Hamilton \$2.50 and \$3.00 (American.) Waldorf Hotel: Hamilton \$2.50 and \$3.50 (American.) Hotel Royal: \$3.00 to \$3.50.

Fifty clinics are already announced, also the largest manufacturer's exhibit ever shown in Canada.

J. A. C. HOGGAN,

Publicity Committee.

OFFICERS OF THE MONTREAL DENTAL CLUB.

President—Dr. J. S. Dohan.

Vice-Pres.—Dr. E.C. Hutchinson.

Sec.-Treas.—Dr. E. J. Stuart.

Committee—Drs. A. C. Jack, C. J. Conroy, R. H. Somers, A. H. Edwards, H.T. Throsby.

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Vice-President—Dr. W.C. McCartney, Ottawa.

Sec.-Treas.—Dr. R. M. Armstrong, Ottawa.

DALHOUSIE UNIVERSITY.

The Convocation of Dalhousie University was held in the Academy of Music, April 23rd, 1912.

The following students of the Maritime Dental College have received the degree of "Doctor of Dental Surgery."

Crowe, Allan Boyd, Annapolis Nova Scotia; Faulkner, Alden West, Selmah, Nova Scotia; Tolson, Harry Stanislaus, Bedford, Nova Scotia.

Halifax, April 26th, 1912.

FRANK WOODBURY, Dean.

HAMILTON DENTAL SOCIETY.

(Reported by J. A.C. Hoggan, D.D.S.)

The fourth annual dinner of the Hamilton Dental Society occurred on Monday evening, March 4th, at the Waldorf Hotel.

Dr. Clapp, of New York, and editor of "Dental Digest," was guest of honor and speaker of the evening. The address which he gave, "Having the Courage of One's Convictions," aroused a very enthusiastic discussion from the largest attendance yet recorded.

The dinner was excellent, the music good and the chairman, Dr. R. T. MacDonald, great.

(Report by J.A.C. Hoggan, D.D.S.)

The April meeting of the Hamilton Dental Society convened at the Waldorf Hotel, Monday, the first evening in the month. After transacting the business of the society, adjournment was made and a meeting of the profession called to discuss the advisability of asking the public to subscribe to the fund "Our Daily Bread." The question was considered both carefully and caustically, then carried with unanimous force. We may now

expect an improvement of 25 per cent. in the character of dental operations in Hamilton.

COUNCIL OF BRITISH COLUMBIA COLLEGE OF DENTAL SURGEONS.

President—Dr. J. M. McLaren.

Registrar and Treasurer—Dr. H. T. Minogue.

Committee—Dr. F.P. Smith, Dr. A. Brighthouse and W.R. Spencer.

Dr. Norman K. Douglas is practicing in Sturgeon Falls.

RECENT GRADUATES OF THE ROYAL COLLEGE OF DENTAL SURGEONS.

John Thos. Adams, Herbert Stanley Allen, Percy Gordon Atkinson, Cornell Oswald Bond, John Menzies Campbell, L.D.S., A.D. Childerhose, T. Cowling, F. L. Dayment, F. R. Davis, Robert S. Decker, Clement Jason Devine, Bruce A. Dickson, Norman K. Douglas, Robert Vernoy Hall, Francis Hinds, John Herbert Hockin, Arthur Robert Hynes, Frederick Henry Jones, M. Katz, Roy Douglas Kerr, Frederick William Landymore, George Austin Liscomb, Walter Gordon Manning, Harold Wilkinson Mitchell, John Howard W. Moore, Warren Morley, Victor Harold McAulay, Stanley Graham McCaughey, Ernest Carlyle McDonald, Roy Gregor MacGregor, Morton Aylesworth McIntyre, J. McAdam McIntyre D.D.S., Donald Keough McIntosh, Robert John Penal, Thomas Harold Renton, Ren Sheek Robertson, W.F. Roper, D. D. S., Frank Ernest Sandercock, Wm. George E. Spence, D.D.S., Louis Ernest Victor Tanner, Archibald Spurgeon Thomson, Robert Dunsmore Thornton, Marshall George Vair, Daniel James Weadlick, D. R. Callum, M. D. S.

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M. H. GARVIN, D.D.S., L.D.S., Winnipeg, Man.
President Dental Society of Western Canada.

Dominion Dental Journal

VOL. XXIV

TORONTO, JUNE 15, 1912.

No. 6

Original Communications

PRESIDENT'S ADDRESS

M. H. GARVIN, D.D.S., L.D.S., Winnipeg, Man.

Read before Dental Society of Western Canada, Winnipeg, May, 1912.

It is with much pleasure and also with much diffidence that I again address you as the President of this, the fourth annual convention of the Dental Society of Western Canada, pleasure at the honor you have done me in selecting me a second time as your first officer, and diffidence at the task of adequately delivering a worthy message to the society.

It would be unkind at least, if I did not at once publicly thank and express the sincerest appreciation of the work done by the other officers and their committees in planning and carrying to completion the details associated with the convention. One and all have worked faithfully and well, and to them is due the success that this convention is sure to be.

According to biologists the test of vitality is proliferation. What are we doing? In glancing back over the past year we find that the members of the society have shown up well in their sympathy with the Miller Memorial fund, and further that all subscriptions have been paid up in full, thereby showing their devotion to the general welfare of the profession. We find that a Dental clinic has been established at the General Hospital in this city, and is doing much good in that direction. We find that our educational committee has been sending out charts, diagrams and lanterns to outside practitioners for the purpose of giving public lectures in dental subjects; that lecturers have been provided here in the city to speak before certain organized societies, and that they are abounding in vital enthusiasm over the work of the future.

And above all, I believe there has been a great personal growth among our members. Our men are bigger mentally, and some physically, since we last met. We have a broader vision and still retain that unquestionable feeling of good fellowship which exists more openly and full heartedly here than in any other profession or in our profession in any other country that I have known. This we shall keep, hold fast and ever develop. We have the men and enthusiasm to carry us to the very top, and one day I believe we shall be there. To do this we must one and all endeavor not only to develop and advance ourselves, but to develop and

advance this society and the profession that we are proud to be identified with.

A traveller is as big as the institution he represents, an ambassador is as big as the king he represents. Our poet laureate writes a sonnet on some drawing room theme, while Homer writes of the Siege of Troy, and Virgil of the art of husbandry and Darwin of the descent of man. These men are as big as the subjects they choose to handle. And so each member of this society is greater if this society is great, and if the society and our profession becomes a greater and nobler profession, as it surely will, then each member will be the greater. So it behooves us to attach our ladder to the stars and live for the advancement of dentistry and all it means to humanity and ourselves.

Pick out the men who are recognized as the dominating factors in the business life of this city to-day—twelve to fifteen in number, and all men who have lived here 20-25-30 years; men who have worked hard and ever had a vision before them, and they deserve the reward that is now theirs. Believe me, these men are men of vision and seeing a vision produces the will power that makes for success. So it is to the busy man we go when we want a thing done, for he is a man of vision, his goal makes him fertile. Vision energizes his mind and enables him to do a hundred little things he otherwise could not do. Then again, the only way to see a vision in the future is to obey the vision of the past and present. It is a great principle of life that emotions that do not register themselves in action are in peril. All things get out of the way of the man who is in the habit of translating his visions into actions. Obstacles vanish in front of the man who goes fast enough, goaded on by a divine discontent, and so I say again, if we are faithful to our vision of to-day, to-morrow we will see a greater vision.

And so gentlemen, I would picture to you a vision that pleases me to dwell upon, for I would have the society of Western Canada the greatest Dental Society in the land, and the members in it the greatest in our profession among the greatest of all professions, which is quite possible if we live up to the visions that come to us.

Nothing can hold Canada back! Nothing! No matter which side of politics you are on. This is Canada's day. Immigrants are flocking to our shores, and it is necessary that we should hold up a high standard of citizenship. It is also necessary that we should hold up a high standard of dentistry.

The Maritime Provinces have contributed perhaps more than any other Province to that list of leaders representing Canada's great men. It is time the great West was making a similar contribution. A leading Maritime dental practitioner in addressing his association said: "We are not urging for more students in our college in order to overcrowd our profession here, but to supply the demand in the North West." Is it not time that we were making provision to supply that demand? Perhaps not quite, but our vision of the future demands that we have a dental college second to none, and that we have associated with that college from its infancy a laboratory for original research.

Then as individuals we must advance, and that rapidly. I believe that the bridge work of the future will be largely of the removable type, and even more importance placed upon hygienic conditions generally. Less

gold and more fillings of a natural tooth color will be used. All dentures must be set up anatomically and bridge-work as well. Vaccines will be commonly used in the treatment of Pyorrhoea. The condition of the mouth will be taken into much greater account in diagnosing many constitutional disorders. The business side of dentistry which been talked of much will be greatly developed, but a note of warning may well be in order. Our first duty as men of our profession, is one of service, not one of making money. We are either dreamers or drudges. The man who gathers up the garbage in our city streets is either a dreamer or a drudge. If his only thought is one of getting through his work some way or other and obtaining his pay envelope, he is a drudge, but if he feels that he is doing his part in purifying the city life and beautifying it, and making it more livable, he is a dreamer. If the physician's first thought is the amount of the fee, he is a drudge; if it is how much good he can do, and how splendidly he can serve his fellows, he is a dreamer, and we should all be dreamers and picture first how well we can do our work. We need not worry so much about the financial part, even granting that our fees are on the average much too low for the service rendered.

This suggests a theme, should fees be recorded on a basis of so much per filling or per crown, etc., or so much per hour? Without attempting to cover the field thoroughly, I believe that neither method is correct. I object quite as much to the patient thinking that Dr. A. charges \$10.00 an hour for his time, as that Dr. B. charges \$10.00 for a gold crown. In the first instance we must remember that in some hours we render several times the service that we do in other hours, due perhaps to our own indisposition, or other reasons, and the same method embarrasses us at many turns and is wrong in principle. The second method is equally objectionable. We should, I believe, accord our fees for the service rendered. For instance—take two inlays, the insertion of which would present equal difficulty and require, under normal conditions, equal periods of time. For some reason that the patient is not responsible for, it takes twice as long to insert one as the other. I take it that the larger fee should be required for the inlay taking the shortest time, because a greater service has been rendered the patient, and a greater skill exerted by the operator.

In the future our profession will pay larger salaries to our assistants, more particularly our office girls. At present the profession is paying salaries in many cases less than girls can earn picking up dishes from the tables of a cafeteria, or as is paid to the wash woman who cleans our floors, and as a result we are not getting the kind of an assistant that the position demands. Capable girls would prefer to be stenographers, nurses or teachers, where the opportunities for advancement appear to be larger. This is all wrong. I believe that the field of usefulness for the office girl, for the dental nurse, has as yet not been explored, and that when it is, we shall demand more capable girls that are open to engage in business life, and that we shall not hesitate to pay the salaries such service rendered demands.

As with the other points mentioned in the vision I would picture for our future, I have given but a brief survey of the matters mentioned, for the reason that a long essay might be written on any one of them, and that profitably also, but time will not permit, and further, that much room may be left for discussion of these very important matters so vital to our

rapid development, and matters that do not come under the subject allotted to the other speakers.

I wish to thank you again for your many kindnesses, for the splendid hearing you have given me, and trust you will discuss freely the subjects I have outlined.

See Discussion—Page 255

THE TREATMENT OF CHILDREN IN DENTAL OFFICES

J. G. O'NEIL, D.D.S., L.D.S., Fort William, Ont.

Read before Dental Society of Western Canada, Winnipeg, May, 1912.

Mr. President and Gentlemen:—

The subject which I have written upon in this paper is according to my line of thought, one of the most essential subjects in the dental profession to-day. I consider that there is no other subject which comes within our scope of thinking, and which may be directly applied to our professional work, that could hold a more prominent place in the minds of the progressive, ambitious, ethical members of the dental profession.

Had I been writing this paper fifteen years ago I never should have made such a statement as the above. To-day we are living in a new era of thought, an era that is pregnated with the most wonderful advances in science, commercialism and philosophy. At the present day we are living in the most enlightened age in the history of the world, and when we stop to ponder, we are amazed at the wonderful ideas that have emanated from that wonderful part of our anatomy, our brains.

During this rapid progress which has been taking place within late years along educational and scientific lines, the dental profession has advanced side by side with all the other professions and sciences. I shall go further and say that I do not think there is any profession or science—comparatively speaking—that has advanced as rapidly as the dental profession.

This advancement is of a two-fold nature, it is of the greatest benefit both to the dentist as the professional specialist, and to the laity as a means of education along scientific lines. The laity are becoming educated as well as the dentist, hence a new era has crept into our code, and to-day, if we should repose for a while and sit down to write out that extremely large code that makes up the profession of dentistry, we should write first in the order of merit and importance—The Treatment of Children.

There was a time when the child of tender years was an unknown person to the dentist. With such a movement being propagated at the present time by the members of the dental profession and other educational bodies, the laity is becoming more enlightened and accordingly as that enlightenment increases more children will be sent to the dentist, and the number will always be increasing.

This subject which I am trying to discuss as intelligently as is within my power, is of a very broad nature and almost, I might say, illimitable in scope. I may truly say that it would not be difficult for one to write a large volume upon this very subject. It could easily be divided

into different stages, as to age, sex, temperament, etcetera, but as I have only been accorded a certain space of time to read this, it cannot be done. It is my intention to make this essay as universal as possible, so that the remarks may have a general application instead of dividing each one into its own special phase, and making the special application.

In dealing with the subject, I wish to impress upon you, that this essay is written more from a psychological, than from a physiological or a pathological standpoint. The dominant note is principally along psychological lines, though later in the paper I hope to touch briefly on pathological and physiological conditions.

Children are the greatest blessing bestowed upon man. They are little angels sent from Heaven to make this world a paradise. They come to fill our hearts with love and gratitude, that for a few short years of our lives, we love and are loved into being decent men and women. They make it possible that the law of love may rule supreme in our hearts; then it is a privilege to the child to obey. It is sweet pleasure to be permitted to do useful things and the whole family is filled with sunshine, love and happiness—the greatest happiness that can exist on earth.

There are two phases to be considered under this subject, and the most important is the management of the child, the second is the treatment of all conditions relating to the dental organs. The first must be accomplished before the second can be commenced, and when the management of the child has been accomplished, the dental treatment is comparatively easy.

Our relations to our child patients should always be of a personal nature and never of an impersonal one. This fact does not apply so much to adults as it does to children. To make my point clear, let me make this illustration: If I want to take a journey, I go to the ticket office of the railway company and pay my money—what sort of a being sits there matters little to me. He may be a nice person, obliging or disobliging, nay, so far as I am concerned, no person is necessary at all. The personality of the ticket clerk does not enter into my case.

This is the impersonal relation. Now apply this in our dealings with child patients—I don't care a jot for the child himself. To me he is merely a means to an end—the collection of my fee—that is all. It is a pure business relation, cold and dry and unemotional. I am using him as a tool, nothing more. I make no appeal to the child's good-will, nor do I make any favorable impression thereon. I regard him merely as a psychological machine to be treated by me, but I lose sight of the fact that I should be drawing that child patient towards me by a bond of sympathy and child love. There is nothing moral, nothing ethical, nothing personal in our relations.

Now, let me give the personal relation—the only attitude which the dentist can adopt and treat children with any degree of success. Here I regard my little patient not merely as a psychological machine to be worked on mechanically, but as a personal being to be acted upon ethically. I regard the child as a subject of feelings and moral dispositions; a being who is affected by my reproach, capable of taking a personal interest in me, and one whom I must draw to me by appealing to his good will and creating a favorable impression of me. My motives in the personal relations are dominated by all the feelings of a man's superior

nature, and in the impersonal my relations are solely and wholly dominated by mercenary ideas.

There is nothing so true as the old saying—more especially when applied to children—as “First impressions are always lasting.” A child either likes or dislikes you from the very first meeting. Create a favorable impression and they are your patients for life, create an unfavorable one, and the chances are that you will never see them again. The mind of the child is very plastic, and can be moulded like soft clay, and creating a favorable impression, the mind has grasped it as it fell upon the soft table of memory and now is fixed there for all time.

As many of us are well aware that a difficult problem that we have to contend with in the treatment of children, is their natural fear of everything pertaining to the dental office. They are often brought in mortal fear and under great nervous excitement, all brought on by the weird tales that they have heard narrated by their parents or elders. Had the child not heard these tales they would occasion the dentist a great deal less worry in their management.

In the case where the child is not too young, it is better for the dentist and better for the child patient that it should not be accompanied to the office by the parent. If the dentist is possessed of any ingenuity whatever along the lines of handling children, he will accomplish more by the parents being absent. The parents, as a rule, dictate to you how to handle their child, and if you make a short study of the character of the child, you will soon know better how to manage the child for your own particular ends than the parent. When the parent is present, the child instantly looks for sympathy from the parent, but the absence of the parent entirely obliterates this thought from their minds. The absence of the parents enables you to go on with your work more smoothly, with less emotion, and your results and ultimate ends are reached more quickly.

Do not deceive the children, nor scold nor humiliate them. Love and appreciation are well-springs of genius. Take heed that you do not slap them and subject them to harsh words. The sensitive consciousness of the child is the priceless gem of gems. Mar it not.

Has the dentist any right to upbraid children because their judgment or lack of it leads them to do that which our judgment tells us is not wise?

Have we a right to assume that they ought to know better, and then censure them because they do not do what we—in our maturer wisdom—think best?

Children in the dental practice are not difficult to manage, ordinarily speaking. They are perfect within, and their bright, happy, open countenances are proof of it. How important it is that children be guided by a feeling of love rather than force. Being cross and irritable with your child patients injures not only the children but your own professional standing. If one is going to conquer by force, why not resort to all the nobler forces of man's higher nature, such as sympathy, kindness and patience, which are planted in the breast of every man, though they may lie dormant.

If, while you are operating for your little patients, they do something which irritates you greatly, do not lose patience with them, but be firm, and exercise control. Do not let them have their own way entirely, but

try to teach them that which is necessary to carry on your work. But always remember to be kind and gentle. We should always remember we are handling sensitive flowers. Do not expect too much. Do not think that the child should know better. The mind of the child is not sufficiently developed to retain and execute rigid orders. Nothing should be taught a child, while under the treatment of the dentist, that is not known to be absolutely true. Children are wonderfully sensitive and susceptible to environment. There ought to be the most perfect systems worked out by the members of the dental profession in this particular phase of our work, viz., The Treatment of Children—whereby the environment for them would be conducive to the very highest development.

In practically a large majority of cases there is no affectation in children. In their minds it is an absolute like or dislike. They say exactly as they think at all times—there being little deceit in their make-up. On account of the foregoing reasons, children are probably in their characters, the truest patients we have. If they are pleased—they are pleased absolutely. There is no intermediate for them. It is either a definite one thing or the other. They are vastly different in this respect from adults. For this reason they are the most desirable patients a dentist can have—after he has passed that point where he understands how to manage that child.

A dentist who is versatile in his character, has much in his favor, when he has children under his treatment. Because he is a man who can readily adapt himself to conditions and environments.

When dealing with children, he has to forget his staid manner—which he is accustomed to while dealing with adults, and take on—I might say—a more frivolous manner. He has to take himself back to the days of his own very youthful life—and enter once more into the spirit of childhood.

Children are appreciative for the efforts expended by the dentist. They appreciate his work in their own peculiar way. They always speak well of the dentist who has been successful with them, and by this means alone will always be increasing his practise.

The men of our profession who are of a highly nervous temperament, would be further ahead in the long run if they would not attempt the management and treatment of the child in the operating room, because his power of resistance along certain lines is low, and when such is the case he is easily irritated, and has little patience. Unless he is prepared to delve deeply into his store of kindness and patience and use them in unlimited supply, he had better abandon the idea of treating children in his dental practice. Nothing should be done for children in the way of dental treatment upon their first visit to a dentist. If there is any pain relieve it, take a short time in trying to become acquainted with the child, then dismiss your patient. Don't hurt them upon their first visit, this is very important to remember. The necessity of short sittings for children need scarcely be mentioned. Half an hour at the longest is sufficient for the majority of cases. It is a very bad principle to give children long appointments and to tax their energies to the utmost, for when you are finished they are utterly fatigued.

Learn, and try to remember, the child's Christian name. The children are similar to adults in this respect. They like attention and surely

will feel hurt if you overlook them. The fact of your knowing their name, and being able to call them by it, gives them a greater confidence in you and a stronger attachment to you, and it helps to break down the barriers of reserve and shyness, fear and lack of confidence. In a short time they begin to feel that they have known you for a long time. If you meet them outside your office, be very sure that you always speak to them, and you will find that it is another step gained along the lines of progression in their treatment.

While operating for the children, try to distract their minds from the thoughts of the operation in progress, by means of talking to them. Try to learn what the children are interested in, and talk along that subject. Tell them childish stories, ask them about their dolls or their teacher, or anything which you may think will interest them, but the main thing is to try to distract them. What interests one child will not necessarily interest another, but a little study will soon reveal to you, just what things to talk about to get the child interested.

In this portion of the article which I am now presenting to you, I propose to deal with the pathological and physiological conditions in the treatment of children's teeth, also intermingled with some technique.

In early childhood, of course, we have only the deciduous teeth to deal with, and there is no more important part of our work than the care and proper treatment of these. Being the forerunners of the permanent teeth, their condition, and that of the oral cavity in general, greatly influences the formation and eruption of these. Every dentist who has many children under his care for pathological conditions pertaining to the oral cavity, and the teeth, should be familiar—or else he should have a chart in some place where he may look it up with readiness—with the time of eruption, calcification and decalcification.

When we are using such drugs as arsenic, carbolic, silver nitrate, etc., which produce a destructive metamorphosis when coming in contact with soft tissues and such drugs as cocaine that produce anæsthesia by a contraction of the blood vessels and by acting on the terminal nerve filaments of the sensory nerves—you will readily see the extreme necessity of knowing these essential points pertaining to calcification and decalcification of teeth. Now, you all know the trouble given with arsenic forced through a large apical foramen, likewise with cocaine, and for these reasons it behooves us all to use these drugs with discretion in children's teeth, and to familiarize ourselves with surrounding conditions.

We all know full well that the pain and suffering that the children undergo is more severe—comparatively speaking—from deciduous teeth than it is later on in life when the permanent teeth are erupting, and that the discomfiture attending the eruption of the temporary teeth is more injurious to their growth and development, than when they are older, because their vitality is greater and also their power of resistance is stronger. Many children who have been credited by their teacher as lacking intelligence, have only been suffering from some dental malady unknown to the parents or guardians of the child.

In small cavities in deciduous teeth where I have an exposure of the pulp, the technique which I have found to be very successful is this: Remove the decalcified dentine, mix up a paste of oxide zinc and oil of cloves, put this paste over the exposure, cover this with Sanoral varnish, and fill in your cavity with Oxophosphate cement.

In simple cavities in deciduous teeth not involving the pulp—I have always inserted one of two fillings, either amalgam or oxophosphate cement. I have never used copper amalgam, so I cannot tell you anything about it as a filling for children's teeth. The choice of a filling depends upon the location, and the temperament of the patient.

In operating for children I use the engine as little as possible. I do as much as I can with spoon excavators, and when I do use the engine, I find that the use of small carborundum stones is much preferable to the little patients than burrs. I have had children as patients who absolutely refused to allow me to use the engine at all, and I have had to resort to spoon excavators entirely. After all, if the spoon excavators are sharp and used judiciously, very good results can be obtained. According to my mind the engine is being used very often where we might use excavators; because we get quicker results, but cause our patient more pain. If it takes a little longer by using an excavator and will greatly reduce the pain, by all means we should use it, and our results in the long run will be better and more quickly achieved.

In the case where the pulp has become putrescent in the deciduous teeth, which is the most prevalent of all pathological conditions relating to children's teeth. The technique I adopt is as follows—open up the pulp chamber—allow the pus to drain for a couple of days—have the patient come back and insert a treatment of Formalin and Tricresol—allow to remain for two or three days and finally make up a paste of Oxide Zinc Formalin and Tricresol, insert this into the pulp chamber and cover over with Oxophosphate of Cement and insert amalgam over this or else make the whole filling of cement.

A very necessary consideration in the treatment of children's teeth is to watch the condition of the first permanent molar, carefully. This tooth is one of the most important in the entire arch. It is the chief, standard bearer of the jaws during the period when the deciduous teeth are being lost and the other permanent teeth are coming into place, and if lost early invariably results in the jaws dropping closer together than normal, which materially detracts from the force of character of the face. When lost early it also produces a malocclusion. In view of its early eruption it is peculiarly susceptible to decay, and should therefore be watched most carefully and preserved by a filling inlay or crown.

One of the chief functions of the dentist is to educate the children to the importance of properly caring for their teeth, and in respect of the first permanent molar, it may be said that this education should begin with the parent before the child is of responsible age, so that the frequent error of mistaking this tooth for a deciduous one and allowing it to go by default, should not be committed. Parents should be instructed to bring their children to the dentist not later than the third or fourth year, and impress on the parents first and then on their children, the importance and necessity of oral hygiene, that we shall have their constant and efficient co-operation in our efforts along the lines of preventive dentistry. When we have accomplished this we may not have so many fillings to insert for such and such a fee, but we shall have the knowledge that we have been instrumental in allaying the progress and preventing the growth of one of the greatest maladies of the human race—Caries of the Teeth.

A FEW POINTS ABOUT SYPHILIS OF INTEREST TO DENTISTS

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Read before Montreal Dental Club, April, 1912.

The importance of this subject is such that I do not feel any apology is necessary for bringing it before a class of men who are brought into more intimate contact with the sufferers from this affection and who at the same time are themselves exposed to greater danger from infection than are any other class of men that I know of, to say nothing of the dangers to others with whom the dentist comes into contact in the exercise of his calling.

The results of investigation by scientific students of medicine during the last ten years have so altered our views with reference to this disease that many of the ideas then held are now known to be erroneous, and I think you will agree with me that much misery has resulted from these erroneous views.

The history of syphilis offers one of the most interesting pages in the annals of medicine. The period of its origin is not definitely known, but it is more than likely that some of the so-called leprosy of the Bible were cases of syphilis. It was certainly recognized in Southern Italy as a distinct disease late in the 15th century when Naples was besieged by Charles VIII. In America it is supposed to have originally come over with Columbus and Amerigo Vespucci in 1492, although Prof. Jos. Jones, in 1878, described unmistakable evidences of syphilis found in the bones of aborigines that had been dug up in the Southern States, so that there are those who believe it was originally carried from America to Europe by the sailors who discovered America. Be this as it may, syphilis was certainly known in both China and Japan several thousand years ago, as is amply proven by documents that have come down to us.

During the earlier periods of its existence in Europe syphilis said to have been so malignant and widely disseminated as to constitute a plague that nearly annihilated the armies of the afflicted countries. The disease has gradually grown milder in type, so that now very severe cases are spoken of as being malignant. The reasons for this diminution in virulence are first improved sanitation and personal hygiene, as well as more rational methods of treatment, and the fact that diseases occurring in individuals of one generation seem to impart a degree of immunity to their descendants.

Lyman of Chicago wrote a very interesting article some years ago which throws some light on this subject. He cites as an example the extraordinary malignancy of measles among the natives of the Sandwich Islands. These natives had never suffered from measles until it was imported by the whites, consequently they had not acquired any tolerance to the disease. Although the population

of the islands was almost decimated at the time, the disease has steadily declined in severity ever since.

Applying this theory to syphilis it may be easily seen that the disease has probably destroyed those least able to resist it, and that the immunity acquired in the case of the survivors by exposure to its influence has been transmitted to successive generations and tended to render syphilis at the present day a very much milder affection.

The importance of hereditary modifications of constitution as produced by syphilis has not, in my opinion, received the attention it deserves from the medical profession, and I am satisfied that many of the hereditary perversions of growth, nutrition and development, are due to its influence somewhere along the ancestral line.

Malformations.—Such as talipes, epispadias, spina bifida, cleft palate and rickets are undoubtedly, in many cases, hereditary syphilis en masque.

Cause.—Ever since the dawn of bacteriology it has been generally recognized that syphilis was caused by some form of micro-organism, so that when Lustgarten described a bacillus in 1884, which he had found in syphilitic lesions, it seemed for a time, at least, that the cause of syphilis had been isolated; these bacilli had, however, not been successfully cultivated, so that the requirements formulated by Koch as necessary to prove the pathogenic nature of a specific micro-organism were never fulfilled. This state of affairs lasted until April of 1905, when Schaudin and Hoffman described certain spiral bodies found in connection with syphilitic lesions and which these authorities claimed was the specific cause of syphilis.

The independent observations of Metchnikoff and Roux, who found similar bodies in apes that had been successfully inoculated with syphilis, tended to confirm their observations. This new organism, now known as the spirochetta pallida, is from 4—20 micro mille-metres in length, very motile, thin and spiral, like a cork screw or wound spring, with tapering ends. The spirals are regular, narrow and deep, and vary from 6 to 26 in number; it has been found in all forms of syphilitic lesion, at all all stages of the disease, in both the acquired and hereditary forms.

Description.—Syphilis is a specific constitutional disease, acquired either by contagion or inheritance; frequently, but not by any means always, during sexual intercourse. It is characterized by the appearance of a primary lesion at the seat of inoculation, followed by periods of eruption, which vary in nature, severity and duration.

Methods of Infection.—The essential requirements for the transmission of the disease are (1) The specific poison. (2) An inoculable situation.

So that any combination of circumstances which brings this

condition to pass is sufficient to procure the disease, sexual intercourse is probably still the means by which it is transmitted in the majority of cases, but the records compiled by many authors go to show that almost, if not quite as many, become infected in other ways. Bulkley, in his well known book, "Syphilis in the Innocent," published in 1894, describes almost every conceivable position and action of daily life as a possible means of transmitting the disease. I shall only refer to a few cases that present points of especial interest to us.

1. A case reported by Dr. Roddick of this city, in which a married woman, age 30, the wife of a physician, developed a chancre of the gum, following the extraction of a tooth, during which the gum had been much lacerated. A careful study of every detail led to the conclusion that the forceps used had been the means of carrying the disease from a patient previously operated on to this case.

2. A case that occurred in my own practice where two young ladies were infected, one on the cheek, the other at the angle of the mouth, apparently from the use of a metal clip used to hold a piece of rubber dam in position, while teeth were being filled, this clip had been previously used on another patient suffering from severe mouth syphilis.

3. A remarkable instance in which nine out of fifteen people who had been tattooed within ten days by the same individual, using as far as could be ascertained the same needles, became infected.

4. Leloir mentions the case of a man with infecting chancre of the gum in which the contagion seemed to have been produced by the process of preparing and filling a decayed tooth.

Lancereaux, Giovannini, Otis and Dulles report similar cases. On the other hand, instances of dentists themselves becoming infected are equally common and I have treated at least five such during the last 17 years.

The earlier manifestations are superficial, the later ones involve the deeper structures, and no organ in the body is immune from invasion, the connective tissues are most constantly affected. At first in the form of a low chronic inflammation and later as the seat of small morbid growths known as gummata.

Course.—After contact of the poison with a surface capable of absorption, a variable period elapses before any signs develop. This constitutes the so-called period of incubation, which is usually about 20 days. Many notable exceptions to this rule have been recorded. Among the most notable of these is the case of Dr. Nott, of New York, who developed a typical chancre 24 hours after wounding his finger during the course of an operation on an infected patient. Taylor reports a case with an incubation of two days, and Hammond one of three days. On the other hand Fournier and Guerin report cases of seventy-five days, the personal equation maintains in this as in every thing else, and it is easy to

understand that one organism may offer more resistance to the invasion than another.

The lesion when it does develop is referred to as a chancre and constitutes the first characteristic lesion of the disease, it may begin in the form of a dry papule, or a moist tubercle, an excavated ulcer, or an eroded surface; it is still a chancre whatever its appearance or situation. Within about two weeks of its appearance the lymphatic glands in its neighborhood begin to enlarge and become indurated. As a rule they are not especially painful and do not tend to suppurate. This marks the end of the primary and beginning of the so-called secondary stage, which in turn has its period of incubation, so that in about a month from the time the glands enlarge, a rash makes its appearance, it is scattered more or less uniformly over the body, is associated with lesions of the mucous membranes and an enlargement of the lymphatic glands all over the body. This stage is occasionally attended by a rise of temperature, which is, as a rule, not high, as well as rheumatoid pains, which are worse at night; there may be headache, the hair may fall out, and the eyes may become involved. These symptoms in the vast majority of cases gradually subside, so that at the end of a year or so there seems to be a natural lull in the course of the disease. There may be an entire absence of symptoms for months or even in exceptional cases years. Then as a rule new outbreaks appear upon the skin, in the mouth, on the fauces, periosteal pains in all the superficial bones may now assert themselves, and a certain amount of failure in general health is the rule.

Now begins what is described as the tertiary stage, and here let me remark that if the secondary symptoms have been mild the tertiary will usually be severe, and vice versa. So that in this stage the manifestations are exceedingly variable in extent, intensity and duration. Any tissue or organ in the body may become involved: the lungs, the liver, the kidneys, the heart, the brain, the blood vessels, the bones, the muscles, the tendons, the joints, and in severe cases a well marked cachexia, indicates the involvement more or less of every cell in the body. This, briefly, is in a general way the course the disease follows. There may, however, be every possible form of exception and irregularity imaginable. As there is no disease or pathological process that can furnish as many surprises as syphilis, what I have just stated applies to acquired syphilis, let us now see what we find in the hereditary form of the disease. As the dentist is not called upon to deal with these cases, as a rule, before the first dentition has been completed, I shall not refer to the conditions that medical men are called upon to deal with in this connection, other than to mention that these children present certain characteristic signs which show very clearly that they are sufferers from a systemic disease. These indications vary, however, very considerably in both character and degree, depending in great measure upon the intensity and stage of the disease in the

parent or parents, as the case may be, that is responsible for the transmission of the disease to the offspring. These children give one the impression of being much older than they really are, often assuming the appearance of wizened old men. They may suffer from eye and ear affections, and nearly always have mucous patches in their mouths, which are highly infective. The first teeth, instead of being cut in the sixth or seventh month, appear either very early (two or three months) or very late (fourteen to fifteen months, or even later). They are especially liable to early decay, but there is nothing sufficiently characteristic about them to be of diagnostic value. But when they are replaced by the permanent teeth one sees the characteristic notched teeth with which Hutchinson's name is associated. Another defect not so often recognized is described by Hutchinson himself as a deficiency of enamel in the milk canines. A central, discolored, blunt peg projects from and is separated by a narrow groove from a base or collar of normal looking tooth tissue. A second, described by Fournier and Darier, is a similar condition affecting the first permanent molars. The enamel on the crown of these teeth is imperfectly formed. The soft dentine grows into irregular projections which fall an easy prey to caries. Consequently these teeth nearly always become decayed at a very early period. Periodontitis is frequently caused by syphilis, and is only a localized expression of the change that takes place in the periosteum and bones throughout the body. Exostosis, due to syphilitic irritation of the periodontal membrane, is another such manifestation, as is pyorrhoëa alveolaris in certain cases. The same is true of dental neuralgias and antrum disease, due to inflammation of its lining membrane and gummata. Irregularities in the size and shape of the palate and teeth may be due to the same cause.

The study of syphilis as it is seen in the mouth and its diagnosis from the other conditions with which it may be confounded is, of course, of more importance to us to-night than its other features. An idea of their importance may be formed from Bulkley's Statistics of Extra-Genital Syphilis, of which over 50 per cent. were acquired from mouth lesions.

The diseased conditions most frequently seen in the mouth and which must be differentiated are:

1. The primary chancre.
2. Mucous patches.
3. Gummata.
4. Epithelioma.
5. Tubercular ulcers.
6. Leucoplakia.
7. Stomatitis.

1. Chancre of the lip or tongue are usually single, and in these situations have no distinctive characters. They are elevated, raw erosions, with a shiny and red or abraded surface, which may or

may not be covered by a membranous film, and the submaxillary glands are always enlarged. There is also induration and deep involvement of the anterior segment of the tongue and circumscribed sclerosis, with much tumefaction of the inside of the cheek or the gum.

2. Mucous patches are by far the more frequent and important lesions we have to consider. They are fully as infective as the full-blown, initial chancre. They may be macular or papular, each type being modified by its situation in the month and by being exposed to friction of contiguous surfaces and of ingested food and drink, heat and cold. They vary in size from a split pea to a ten cent piece, or even larger. They may be round, oval, or irregular, often visibly raised above the level of the surrounding tissue, usually painful, and most frequent oppose each other, where the mucous membrane comes in contact, such as the angles of the mouth, the cheek and gum, the two halves of the angular crevice behind the last molar teeth. A common development in these lesions is a superficial ulceration, due to the removal by friction of the already damaged epithelium. so that they bleed easily when touched, are very sensitive, and have a tendency to extend along the lines formed by the folds and angles of the mucous membranes.

3. Gummata occur in all the regions of the mouth, as infiltrations diffuse or circumscribed, usually single, rarely multiple, breaking down easily into ragged ulcers, with irregular edges. The substance of the tongue and the centre of the hard palate are common sites for these lesions, which do not, as a rule, occur before at least a year from the time of infection.

4. Epitheliomata are often difficult to distinguish from syphilitic lesions. Here the process is much slower than in syphilis. The patient is older—usually over 40 years of age; the pain is usually greater, and the mass may present a warty appearance. The lesion, as a whole, is larger and bulkier, and if ulceration takes place, the edges are everted and the base of the ulcer is more florid.

6. Leucoplakia, often spoken of as smoker's patches, are lesions that are now regarded as being of syphilitic origin, and aggravated by smoking. They may appear as patches, spots, or bands of dull opaline, smooth or rough areas, in the mouths of syphilitic patients who have previously had mucous patches. Frequent situations are along the lines of the jaws, the tongue, the inner side of the cheeks, the angles of the mouth, the gums, and they are supposed to tend to the development of epithelioma, which is certainly often seen associated with these lesions.

7. Stomatitis is a condition that sometimes becomes so severe as to simulate some of the lesions described here. The multiplicity of the lesions, their rapid development, the foetid breath, are, as a rule, sufficient to establish the diagnosis.

Neisser, as a result of three years' experimental work on syphilis, has come to the following conclusions:

The spirochetta of Schaudin are the cause of Syphilis. Wherever they are found syphilis is surely present. Negative results must be very carefully interpreted, as the organism is not easily demonstrated.

In apes the typical chancre develops in from twenty to fifty days after inoculation, thus corresponding to the period in man. Apes are subject, also, to the constitutional symptoms of the disease. Inoculation of matter from tertiary lesions proved successful, and produced the same symptoms and lesions as inoculations from primary lesions. Outside the animal body the virus soon loses its virulence, probably within a few hours. It can also be destroyed easily by physical and chemical methods.

That syphilis can be cured is demonstrated by the fact that animals inoculated with the disease and subjected to treatment have later been again successfully inoculated. Neisser denies the fact of immunity, and lays down that only syphilis-free subjects can contract syphilis. Persons refractory to syphilitic infection are themselves actually syphilitic. The serum diagnosis of syphilis introduced by Wasserman is strongly supported by Neisser, who says, dogmatically and categorically: "Only with the serum of a syphilitic person do we get a positive reaction. A negative result is, however, not of equal value."

Noguchi, of the Rockefeller Institute for Medical Research, has just given the world a new test, which is known as the Luetin reaction, which is even more reliable than the Wasserman reaction, and has the additional advantage of being applicable in cases that do not react to the Wasserman test. These two tests, in addition to the well-known clinical signs of the disease, should make a diagnosis possible in any doubtful case.

Prevention.—The medicine of to-day is teaching more than ever before in the world's history "that prevention is better than cure," and I know of no disease in which this applies better than in the case of syphilis. The state assumes the responsibility of safeguarding us against smallpox, scarlet fever, diphtheria, and other contagious diseases, but does not pay any attention to syphilis, which, we have seen, is quite as serious as any of the other diseases mentioned and further reaching in its effects. Such time-honored institutions as the public drinking cup, for example, should be done away with.

Education of our patients to a sense of their duty towards their fellow-beings, with a view to preventing the dissemination of the disease among those with whom they come in contact is, to my mind, the duty of every physician or dentist who has to do with such a case.

Greater care on the part of dentists as regards the sterilization of instruments, either by boiling or by immersing them in anti-septic solutions, such as carbolic, 1-100, or lysol. Protecting their fingers during operations on infected patients, either by the use of

rubber finger cots or coating the fingers with collodion, or the thorough innunction of the fingers with a 33 per cent. ointment of calomel in lanoline, which will, in most cases, destroy the spirochetta, and even prevent infection from developing, if it has already taken place.

Treatment.—It should be thoroughly appreciated that the lesions seen in the mouth of the syphilitic are but the local manifestations or expressions of a constitutional disorder, which it is quite impossible to eradicate by the treatment of these lesions alone. Mercury the iodides and arsenic, in some form, are the remedies most commonly employed for this purpose.

Theodoric, a Dominican monk, used mercury by innunction as early as 1250 A.D., while Ricord used arsenic in the form of Donovan's solution. Later Hallopeau used atoxyl, another preparation of arsenic, and, more recently still, Erlich and Hatta introduced Salvarsan, or 606, which is also a preparation of arsenic. Erlich claimed for this preparation the power of destroying and eradicating the disease with one single dose of this remedy. Unfortunately, time, which is the test of all remedial measures, has proven this statement to have been a sad disappointment; and, while the preparation has an undoubted sphere of usefulness, it has fallen very far short of the claims and hopes that heralded its advent. The consensus of opinion at the present time among those best qualified to speak is that several doses of Salvarsan should be given intravenously at regular intervals, and that mercury should be used during these intervals, preferably by the hypodermic method.

Personally I make it a rule to keep these patients under observation and, if necessary, treatment for a period of five years; and, even after this period, I advise the patient to take a six weeks' course of treatment each spring and fall for the rest of his life, to insure against any return of symptoms. I have never had cause to regret this stand, which in my hands has secured for me better results in the treatment of this disease than has attended the use of any other method that I know of. I try to get my patients to look upon this annual treatment in the light of an accident insurance policy against any syphilitic contingency or relapse.

DISCUSSION.

Dr. Stevenson—(1) Can hereditary syphilis run itself out?

Ans.—There is undoubtedly a tendency on the part of the organism to spontaneous cure, so that in time the disease may gradually disappear through successive generations.

(2)—Is 606 a poison?

Ans.—Salvarsan, being a preparation of arsenic, is possessed of toxic properties. Great care and judgment are necessary in deciding the question of the dose that should be used in individual cases, several instances of distressing symptoms having followed its use having been reported.

Dr. Giles—What are the best means of sterilizing one's instruments?

Ans.—I should advise scrubbing instruments with a brush and biniodid of mercury soap, such as the germicidal soap, manufactured by Parke, Davis & Co., which will not corrode instruments, after which they should be boiled for from ten to twenty minutes.

Dr. Springle—(1) Is the saliva infectious?

Ans.—Yes, especially if there are any lesions in the mouth.

(2) Are the teeth invariably affected in congenital syphilis?

Ans.—No, not invariably. It is only when they are affected that they are an indication of congenital lues.

(3) Have spirochetta ever been found in the substance of the teeth.

Ans.—Not as far as I am aware.

(4) What constitutes the danger in extracting teeth for syphilitic patients?

Ans.—The possibility of infection to the operator from the saliva, blood, or secretion from mucous patients that may be present in the mouth.

Dr. Wells—Are there different forms of spirochetta, having different indices of virulence?

Ans.—There are several forms of spirochetta found in the mouth normally, notably the *S. refrigerous*, the *S. microdentia*, and the *S. macrodentia*, but the *S. pallida*, which is not found in the mouth normally, is the only one that is capable, in the light of our present knowledge, of causing syphilis. These different forms can only be differentiated with any degree of certainty by cultures where they exhibit distinctive characteristics.

Dr. Oliver—Is it possible to become infected by inhaling the dust caused by drilling a tooth?

Ans.—I do not believe this to be likely, as the spirochetta do not live very long in the dried state.

Dr. Armitage—Can the mouth be rendered sterile?

Ans.—As far as our present knowledge goes, it is not possible to render the mouth absolutely sterile.

FAILURES IN CROWN AND BRIDGE WORK: THEIR CAUSE AND CURE

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Read before the New York State Dental Society, Albany, N.Y., May, 1912.

In the State Legislatures of this country, and in the Provincial Legislatures of Canada, as well as in the Federal Governments in both countries, politicians good, bad, and indifferent, statesmen wise and otherwise, legal luminaries, and listless laymen, have been putting upon the Statute books, laws and regulations, the meaning of which will be known only when the courts of the land shall determine the meaning of the language used in constructing them.

The question is often asked: "Why can not laws be framed so simple, plain, transparent and unequivocal that their meaning may be easily comprehended, and their object readily attained?"

The answer to that question is not hard to find. The reason is that so much of our language is relative rather than absolute; truth is viewed by different persons from different angles of vision, and a sentence of a dozen words, may convey to a dozen persons a dozen different meanings.

This relative value of words is nowhere more in evidence than in the discussion of professional subjects, in medicine or dentistry, for in dealing with such we are constantly in touch with forces that are but little understood, and far from being fully under control.

We speak of "vital force," "nervous energy," "assimilation," "nutrition," etc., etc., and all the time we are conscious of the fact that we are using words, the meaning of which we do not at all fully appreciate. So when we write or speak of success or failure in any operation, we are using relative and not absolute terms.

An operation, performed for one person, and under certain conditions, might be an unqualified success, and a similar operation performed for another person, and under different conditions, might be an absolute failure.

Let us, then, seek a common standing ground, that we may discuss the subject from a common view point, and if possible arrive at some well-defined, and desirable conclusion.

The first question then to be determined is "what is a failure?" In general terms failure is "not obtaining the desired end." That end may be good or bad, high or low, honest or dishonest, esthetic or vulgar, temporary or permanent. But what does "failure" mean, as the word is used in connection with dental operations, and especially in connection with operations in Crown and Bridge work. Perhaps the following will answer as a definition; that operation or restoration by crown or bridge work, may be said to be a failure which does not render the patient the maximum efficiency (1) in serving the purposes formerly served by the lost tooth or teeth; (2) in duration of service; (3) in esthetic effect; when all the conditions and circumstances in connection with the operation, are intelligently considered. What is the "ideal" standard by which success or failure, must in the final analysis be judged? There can be

but one answer. The ideal aim would be to make a restoration as perfect as the natural tooth or teeth, when in a normally healthy condition.

This, of course, is manifestly impossible and must always remain so. Why?

1. Because any tooth, requiring repair or restoration, is in an abnormal or pathological condition to begin with and restoration must be made with a foreign material, which can never become an integral part of the human economy.

2. The union between the natural tissue and the material used in making the restoration must be mechanical, not vital and the line of union must of necessity always be a vulnerable point for bringing about further and additional pathological conditions.

3. The very great difficulty of harmonizing a metallic or mineral substance with animal tissue, such as the dentine or enamel of a tooth.

4. The destructive forces, which produced the conditions which made an operation necessary are constant, in their operation, a continuous menace to the stability of any operation.

5. In the vast majority of cases, where artificial crowns are to be adopted, devitalization is a primary necessity and our restoration is attached to, or resting on, a non-vital and therefore unstable support.

5. Human imperfections in mechanics and in art, are bound to manifest themselves. Our "best" is but a poor imitation of The Master Mechanic's perfect masticatory apparatus.

Hence "perfection" is not our standard. As Dr. Weston Price, of Cleveland says: "There is no such word as perfection in the practice of dentistry.

If, then, absolute perfection may not be attained in our operations, what standard may we establish, towards which we may work, or at which we may aim, and by which we may decide whether the operation has been a success or a failure?

In all our operations, we must bear constantly in mind the fact that we are dealing, not only with the crown or bridge, which we ourselves may make, but we have to consider as well, the natural teeth and other tissues to which these crowns or bridges may be attached, or which may be affected by their presence in the mouth.

If the question were asked: What does the conscientious operator expect to do, in the field of crown and bridge work?—the following reply might be made:

1. Where a tooth has been lost, or a number of teeth have been lost, from the dental arch, it is the aim of the operator to preserve or restore the integrity of that arch.

2. This preservation, or restoration, should be brought about, with the least possible sacrifice of serviceable natural tissue, and by the introduction into the mouth of the least possible amount of foreign matter, commensurate with the service, which the crown or bridge is to render.

3. To make such restoration, natural in appearance and to harmonize with the other features of the face.

4. To give to the patient, a condition or feeling as nearly natural as possible, so that there will be the least possible consciousness of the restoration which has been made.

If this standard be an acceptable one, then failures may be divided into two classes, preventable and non-preventable.

Among preventable failures might be cited such cases as the following:

1. Where it is possible to secure sufficient strength in a crown or bridge, to withstand any reasonable force that may be put upon it, and for lack of knowledge or for economy's sake the piece is not made sufficiently strong, if failure occurs, such failure is preventable and should be condemned.

2. If in making a piece of bridge work the abutment (natural) teeth, are too few in number, or insufficient in power of resistance to withstand the force which may be applied, then and if from such cause, failure results, such failure is preventable, and can not be excused.

If in the preparation of the natural crowns or roots of teeth there should be insufficient reduction to permit of sufficiently accurate mechanical adaptation, and if failure results from this lack of proportion, it is difficult to suggest a reasonable excuse.

4. In adapting a crown, there is often lack of continuity of outline between the natural tissue and the added material. Because of this, failure is almost inevitable, and by the exercise of due care and the expenditure of sufficient time and energy this prolific source of failure may and should be prevented.

5. If for any reason a crown or bridge should exert upon the antagonizing natural teeth such force as would cause periodontal inflammation, such crown or bridge would come under the category of preventable failures.

6. Lack of conformity to type, or divergence from anatomical outline, is a cause of many failures, which might be prevented by a more careful and persistent study of dental anatomy.

7. Mechanical imperfections or faulty technic, is a fruitful cause of failure, and, of course, must be classed as preventable.

Among non-preventible failure might be mentioned:—

1. Where on the part of the patient, there is an inability, or unwillingness, to endure the inconvenience and suffering necessary to make perfect preparation, and failure results because of this lack of preparation, then such failure must be classed as non-preventible.

2. Where a crown or bridge is inserted, and no subsequent care is given to it, and no attention is paid by the patient to ordinary mouth cleanliness, if failure follows it should be placed in the non-preventible class.

3. The physical difficulties which present, in the form of tortuous roots, malposed teeth, and all degrees of lack of conformity to normal occlusion in the remaining teeth, all may conduce to failure, and such failures must be looked upon as non-preventible.

4. Ability on the part of a patient to exert excessive force in the process of mastication, often causes disastrous failure, but such failure should be placed in the non-preventible class.

Dealing only with preventible failures, how are we to account for the appalling number, of which every thoughtful and honest dentist has all too abundant evidence? What are the causes which produce these results? Fault has been found with the text books, the colleges and the teachers of crown and bridge work. Dentists have been accused of lack of skill, lack of knowledge, lack of artistic taste, and lack of common honesty. The cause of so great a number of disastrous failures

cannot be laid at the door of any one of these things, nor on the shoulders of all of them combined.

It is true that the text books are far from being perfect. The inspired writer says "of the making of books there is no end." In the subject under discussion the end seems to be to "make" a book. In many of them there is a vast amount of irrelevant padding and unreliable teaching. "Having something to write about" has evidently given place to "having to write about something." And yet there is much desirable information in many of the text books. But the difficulty is, you have to consume too great an amount of weak, watery, nutritionless "broth" before encountering the oyster of helpful knowledge.

The colleges, too, must assume their share of the blame for furnishing so many of the causes of failure.

Those who prepare our college curricula have not yet realized the importance of the subject, and our students leave our colleges but illy prepared to perform the intricate operations involved in crown and bridge work.

Perhaps those least to blame are the men who have taught the subject. Because the making of a crown or bridge has been looked upon as purely "mechanical," teachers of this subject have refrained from advocating its claims, knowing that some pseudo physician, or scientist in embryo would deplore the fact that teachers of crown and bridge work were trying to make goldsmiths, or glorified mechanics, of our "glorious profession." And yet the fact remains that many, many, many of the most glaring failures with which we come in contact occur through lack of ability to do ordinarily good technic work.

Lack of common honesty accounts for many failures, for no one can deny the fact that many crowns and bridges are inserted by dentists who sin against light and knowledge. I suppose there must be some place and reason for snakes, and fleas, for reptiles and beasts of prey, and professional men who trade on the credulity of their patients must be placed in the same class, and in the economy of men and things, "tolerated" in the same way.

While it is undoubtedly true that the causes to which I have referred may account for many failures, it is reasonably certain that they do not account for the general inability among the rank and file of dentists to do successful crown and bridge work.

When all the matters in connection with this question are intelligently considered, the wonder to me is, not that such work is so badly done, but that it is done as well as it is. Did you ever stop to consider, or ask yourself, what a dentist must know, in order to do crown and bridge work successfully? He must have a knowledge of anatomy, particularly a very accurate knowledge of dental anatomy—he must know physiology, pathology, histology, bacteriology, pharmacology, metallurgy and physics, art in general, ceramics in particular; in short, he must possess the mind of a philosopher, the hand of a sculptor, the courage of a soldier, the sympathy of a mother, the endurance of a martyr, the morals of a saint, the patience of Job, and the skin of a rhinoceros.

In all seriousness, let me say the demands are so great that few men, in any walk of life, could ever hope to become an expert in this field of professional work.

There is, however, another factor which enters into the causes that

result in this general inability to measure up to a high standard of success.

Most men, when they graduate, realize their own incompetence, and in order to make the best showing possible, send their crowns and bridges to mechanical men, or dental laboratories. Often these crowns and bridges are made from very indifferent models or impressions, which come to the laboratory man accompanied by very hazy instructions.

The crown or bridge is made, and usually looks all right, as you view it in your hands. But then the tooth or teeth must be reduced to permit adaptation, and reduction goes on until the natural tooth is made to fit the abutment crown, and the whole process is of the "cut and fit" variety which must inevitably end in failure. You may put it down for a fact that all natural teeth must be first properly prepared, and all bands and caps fitted by the dentist himself at the chair, before the model or impression, bearing these bands or caps, in proper relative position, are handed over to the laboratory man, be he never so skilful. Laboratory men may become very expert in doing their part of the work, but success or failure depends more largely on accuracy of adaptation than on perfection of polish.

A very fruitful cause of failure is the fact that men cannot or will not recognize the limitations of the practise of this branch of our work, and they attempt the impossible. Operations so intricate that only mechanical geniuses could execute them, and so extensive that they cause their own destruction, are attempted by men of average ability and little experience, and the result is, as may be expected, the achievement of a novice or tyro.

One other cause of failure I will mention and leave the rest to your imagination. Our college authorities have not yet waked up to the tremendous amount of training necessary to prepare a student to do successful crown and bridge work.

A carpenter, a blacksmith, a plumber, a machinist, a painter and paperhanger, will spend three or four years in acquiring a mastery of his trade or calling—but a dentist learns crown and bridge work in not more than two hundred hours, or about twenty-five days of eight hours each, and, as I have already said, I know of no profession, trade or handicraft that requires so wide a knowledge, and so high a standard of ability, and such persistent application, if success is to be attained, as the subject under discussion, viz., the successful practise of crown and bridge work.

If we are to see fewer failures in the mouths of our patients, our students at college must have infinitely more training, for we must never lose sight of the fact that as a class, dentists are not more than others men of extraordinary mechanical ability.

Perhaps the discussion of the causes of failure has suggested the cure. I know well that at the present time emphasis is being placed on "oral hygiene" and "preventive dentistry," and men are looking forward to that millennial dawn when the educational campaign now in progress will have borne fruit, in mouths where fillings, and crowns and bridges will not be necessary, and the people who wear artificial dentures will be

on exhibition as freaks or curios in a dime museum. But evolutionary epochs are of long duration, and the present generation of dentists may make up their minds to continue the making of artificial substitutes for lost teeth. For this work long and careful training is absolutely necessary. Our colleges must see to it that the students have time and opportunity not only to make three or four crowns and a couple of pieces of bridge work, but time and training sufficient to enable them to make and adapt crowns and bridges that will measure up to the requirements of this division of our professional work.

This college work should extend over three years, and be graded from the simplest exercises in soldering to the making of the special appliances so often necessary in the thousand and one strange cases that present themselves in every practice. In this college work, one great change must be brought about. Crown work cannot be taught on metal models, nor on teeth carved from bone, ivory, celluloid or other material. Students must be taught to make in metal or in porcelain correct anatomical reproductions of the natural organs, and to do this they must work on natural teeth. One great cause of failure that I have designedly left to this part of my paper is that few dentists realize how much grinding must be done, in reducing a tooth, to properly adapt a crown embodying the fall band principle.

If we would avoid failures in the future, dentists must realize that the laboratory man cannot do the "fitting" that lies at the very foundation of a successful operation.

It takes time and energy and skill to make a successful crown or bridge. At the present time these three commodities, when in combination, and are being eagerly sought after and highly remunerated. The average dentist is not getting enough for his crowns and bridges to put into them the necessary time, energy and skill.

One cure for many failures would be "take more time," make "the best you can do, the worst you will do," and then charge for it.

Learn the limitations of crown and bridge work. A good denture is infinitely better than a bad bridge.

Learn to appreciate the beauty and value of a good tooth, and do not ruthlessly or needlessly mutilate one.

And remember, above all, that crown and bridge work cannot be learned from a book. You learn to do it by doing it.

Finally, brethren, be charitable. Be charitable of the work of others. We never know all the conditions that obtained when the work was inserted.

Proceedings of Dental Societies

THE DENTAL SOCIETY, WESTERN CANADA

The meeting was called to order by Dr. Garvin, the President, who was in the chair.

PRESIDENT: It is with very much pleasure that I call you to order for this, the Fourth Annual Convention of the Association, and as I intend to speak at greater length very soon, I will not detain you now. I would ask the secretary to read the minutes of the last meeting.

PRESIDENT: It has been our custom, gentlemen, at an early point in our proceedings, to introduce our guests to the members present, for the reason that we want everybody to see them and see what good-looking fellows they are, and we want to receive an inspiration from their presence, and to hear their impressions as to our great Western city. I want them to feel that they are one of us, and feel free to speak on any subject that may arise here. When the time comes for men of Western Canada to hold a dental convention, they hold one, that's all! And it is our endeavor to have the very best men throughout the world address us; and we have this time succeeded in securing two leaders of our profession, men of world-wide reputation, and men that you will learn to love before they leave this city on Wednesday.

I will introduce first, one whose name is famous for his work along therapeutic and pathological lines, and who deserves the greatest appreciation from the profession for the services he has rendered not only the profession, but humanity in general, Dr. J. P. Buckley, of Chicago.

DR. BUCKLEY: Mr. President and Members of the Society, I thought when the President was talking of the various things that we had done, that of course he was going to call on Dr. Prothero, because he is one that should have preceded me, being old enough to be my father. But indeed I am glad to be here, gentlemen. I have prepared to attend various societies both in Canada and the United States, but I don't recall having made arrangements to attend any meeting wherein my fellow practitioners in Chicago seemed more concerned, wondering, perhaps, if I would make good, as I did in making the arrangements to come here. Men who have been here from Chicago are all anxious to know when I was going to leave and wanted me to carry their greetings to you. Among them, Dr. C. N. Johnson, Dr. Goslee and Dr. Roach, in particular. Dr. Goslee even took me from the faculty meeting (which my associates in the college were kind enough to change from a later night of this week to last week, in order that I might get away) to the train and wished to be remembered to the boys in Winnipeg and this part of Canada. Now as I listen to the Secretary's report, I learn that we have had here Dr. Webster, and Dr. Hartzell, who are working along practically the same lines as myself, and I feel a great deal like the bed bug that met the cockroach at the church social. They met in the hall, and the bed bug said: "Hello! Cocky are you here?" The cockroach said: "I guess I am; don't you see me?" "Well," said the bed bug, "did you get an invitation?" "I certainly did," said the cockroach, "or I wouldn't have

come. Did they ask you, too?" "Yes, they asked me, too, and I wonder what in the devil they want the both of us for?" So when I learned that you had Dr. Hartzell, and I felt that he had covered everything that I had in mind to cover, I felt a great deal like the bed bug did on that occasion. I am not going to take up any more of your time except to say this: That while both of us practice in Chicago and are supposed to know each other, we don't, and I feel that this trip, if for nothing else, was invaluable to have formed the close acquaintanceship that I have with my friend Dr. Prothero. I have known of him for years, but I have never known him as he really is, not having been one of his boys; and I am going back to Chicago feeling that I have made one staunch friend from Chicago and many more here among the members of the Society of this part of Canada.

PRESIDENT: I have much pleasure now in introducing Dr. Prothero. His reputation has preceded him by many years. He has written a book on his subject, which many of us have read and found it to be of absorbing interest, and I think that we are very fortunate in having him here with us. I appreciate what he has done for the profession of dentistry throughout the world.

DR. PROTHERO: I cannot express the feelings of gratitude that I have of being able to be with you to-day, and also at hearing the kind remarks made by my friend, Dr. Buckley. It is true we have known of each, other, but although we both live in Chicago, we have never become intimately acquainted. Chicago is a big place, and many of us there, who are all good fellows, don't get acquainted, and it is only on such trips as this that we get to know each other. I feel as though the trip was well worth taking, not only to make one acquaintance, but I know that you have a lot of good things in store for us here. I think that I have struck a pretty live bunch. When I heard the minutes of the meeting of last year read and heard that Dr. Cummer had been here, I recognized Dr. Cummer as a splendid man. I imagine that his work of last year would be along similar lines with the work I expect to give you. But we are all more or less human and it is only by constant repetition that we learn anything, I know that is the way with myself. It is the same way with the students; you have to repeat and repeat and repeat. The first time you hear a thing you will catch one point; the second time you hear the same thing you catch another point that escaped you before, and after a while you gain a working knowledge of the subject and you are able to go ahead.

I feel a good deal like Mary and John. Mary and John were two young folks that were taking a ride one day in a buggy, and they had driven out among the country roads for a long distance, when John said to Mary: "Mary, will you be my wife?" She hesitated a moment and then said: "Yes, John, I will be your wife." They rode on for perhaps three or four miles, and finally Mary said: "John, why don't you say something?" He said: "Mary, I have said too much already."

THE PRESIDENT DELIVERS HIS ADDRESS—SEE PAGE 229.

DISCUSSION.

DR. WALSH: I had intended to say a few words, but I am rather taken aback at being called upon first. However, I have not to add anything but one thing, and that is to emphasize the importance of the Miller Memorial fund.

Original research work, particularly in Western Canada, is practically an unknown quantity; it amounts to practically nothing, for many, many reasons. Everything is in a state of transition in our country. This practically applies everywhere from the Great Lakes to the foot of the Rockies; everybody is in a rush and a hurry. It is ubiquitous, and I do not see how we can get away from it in this new country, where the map is changing almost every day. We have not as yet learned how to live and to render service to others as they have in older communities; as they do in Eastern Canada and in the States and Europe. If we let our mind travel back a little, and think of some of the sacrifices that some of these men have made on our behalf and on the behalf of the people at large, we need not be ashamed when such names are mentioned as Wallace, John Holmes, Farmer, Alport, Cushman, Paris, and others that you can think of, and many others we are familiar with as younger practitioners; Millar, of Portland, Black, of Chicago, and not the least among those are two that are with us to-day, Drs. Buckley and Prothero.

It was, therefore, particularly gratifying seeing that we as people—I refer particularly to Manitobans—since we cannot give of our time to research work, we have seen our way clear to help others, who have been generous enough to give part of their time and service to that work.

I am glad the President laid stress upon the business side of our work. Personally, I am not at all in sympathy with a great many articles that have been published on this question in the last two years. Looking always as to the amount of the fee is not altogether right; look to the service you give, although the fee is absolutely necessary—I have found that out myself, and possibly some others have experienced that also.

In regard to the spirit of good fellowship, I don't think that Drs. Prothero and Buckley will find us behind in that. I have been 10 years in the city, and have yet to meet a better grade of men. The members here are not only acquaintances, they are friends in all the sense the term applies.

Speaking for myself, I won't say how pleased I am to welcome our guests, Dr. Prothero, since he is an old friend of mine, and Dr. Buckley who, while I have not met him personally, I consider I have known him for a long time. I was one of perhaps about 600 individuals who made life unbearable for Dr. Prothero, and I can tell you he was never out of patience with us. One day, by fortunate providence, I got a patient, who required a plate, I got the impression, or at least I got what I thought was a sufficient impression. I took it to Dr. Prothero, and said: "Do you think this is far enough back?" "Well," he says: "What is your idea; do you want to take an impression of the patient's stomach?" (Laughter). I felt then that I had it fairly well.

DR. BUSH: Mr. Chairman, Mr. President and Gentlemen: When I first came into this room my little heart was struck with delight at seeing

the Union Jack alongside of the flag of the American visitors, "Old Glory," but a second look at the Union Jack caused me to look with anxiety at the face of our President, for, gentlemen, the Union Jack is upside down; that is a signal of distress. After looking at the beaming countenance of both gentlemen on the platform I have come to the conclusion that the decorator made a mistake, and that it wasn't hung there purposely as a signal to distress.

Dr. George C. Matheson, sometime within the last 50 years gave a short address before a number of us, and started by telling us that before venturing to read a paper before such an intelligent body of men as we were, he had taken the trouble to read through the whole of the *Encyclopedia Britannica*. Whether Dr. Garvin has read through the whole of the *Encyclopedia* or not, he has certainly gone beyond that. It was one of the most comprehensive and charming addresses I have ever listened to.

I don't propose to take up very much of your time because we want to go on with the programme.

I am glad to see that the Miller Memorial Fund was so well responded to in the North West, because in the first place, we are able, as Dr. Walsh has just said, to help those who are willing to give time to original research. It also shows that the members are willing to help along a good cause; and there is some comfort in this, that when we pass to the Great Beyond there may be some help for our wives and families, should they be in distress.

I will make my report in regard to the Dental Clinic at the hospital later.

Now, in regard to the business side of dentistry: I quite agree with Dr. Garvin that \$10 or \$100 an hour, or so much per crown or so much per filling is a wrong principle. The business profession, "professional business," as our friend Dr. Matheson once called it—of course, naturally we must look to the business side so that the patients may give us a reasonable amount of recompense—certainly not anything like the recompense they should give for the benefit they receive—but a reasonable amount. At the same time, when once we have undertaken the work, I quite agree that we should not think of the fee at all. We should not be in the position of the surgeon who performed an operation, and after it was through one of the students asked him: "Doctor, what did you operate on that man for?" "\$500," the doctor answered. "Yes, but what did you operate on him for?" "\$500.00!!!!"

At the same time I claim that the profession of dentistry renders to its patrons a great and more permanent service day in and day out than any other profession or business in the world for the equal amount of fee. A lady will go into a shop and purchase a dress costing \$50.00; it is worn three or four times perhaps for the time being, yet many of them think \$50.00 for a dentist's fee extortionate, though the service rendered would improve their appearance fifty times as much as the dress, besides relieve pain and various other defects.

I will conclude by just mentioning this: Dr. Garvin said that "A traveller is as big as the house that employs him," and "an ambassador is as big as the king"; certainly no bigger. A traveller is certainly no bigger than the institution he represents; at least, the institution should be as big as he and just the same with us. Our profession depends on

ourselves as to what it is actually going to be. Dr. Garvin mentioned a number of business men in Winnipeg those men have not risen to prominence just on account of their business learning, but they have risen to prominence because they have taken an interest in something else besides their business. They are men of public affairs; men who are known for something, and this is my opinion that we as dentists do not take as much interest, perhaps, when I say in public affairs, I do not mean that all men can be public men, but interest in the affairs that many other people do. Perhaps a great deal of that is due to our lack of time, and we are tired after the day's work, but I fancy that everyone should have a hobby of one kind or another, and that we should be known not say, as Dr. Jones, the dentist, but as Dr. Jones; and Dr. Jones should stand for something. Something either in the world of art, music, literature, science, sport, if you will, but something, and his contact with other people along these lines will raise him to something more than merely Jones, the dentist, but he will be known as Dr. Jones. That immediately will raise the profession, and I think that should be developed as much as possible. All the men in our profession have education enough to carry out anything they take up. It is merely a matter of inclination. But, of course, after all, dentistry is our profession, and to that we should concentrate a very large proportion of our efforts to raise the profession and keep it in an honorable position before the public.

So, whatever we undertake, if we undertake it with a solemn purpose, love and admiration will be ours in abundance.

DR. HARWOOD: I am rather taken aback at being called upon to enter the discussion on the President's address, but I am very glad of the opportunity of being able to say a word or two. I don't pretend to wax eloquent like our worthy late speaker. Speaking is not one of my accomplishments. If more men would look into the vision of the future, that is, dentists, I think that dentistry would more rapidly gain the prominence that it naturally deserves.

I was also struck with the wealth of good fellowship that prevails in the society, not only in the association, but among men in other cities. Speaking for our little village of Moose Jaw, I might say we have a dandy association up there. We meet every month, and it is one of the best things I know of to encourage a man to keep his interest up in dentistry, to be able to rub shoulders with everyone, and not call the man across the corner "my opposition." He is our confrere, our brother, and just as soon as we begin looking at the other men in that light, there will be less of this "knocking." Of course, that is particularly conspicuous by its absence in the West, and I think everyone here is glad to see it. I cannot stand for anything of that kind. If I cannot be friendly with the men in my own neighborhood, why I would move to some other neighborhood.

Our President also mentioned the business side of dentistry. That has, as you know, been receiving considerable exposition in the "press"—that is, our dental literature—and I don't think it is any too soon. A laborer is worthy of his hire, no matter what particular branch of work or profession he may be in, and I think we ought to consider the business side to some extent. I think possibly it would not hurt to have some of the colleges see that the students before leaving are properly instructed

in the business side of their profession. It seems to me that a chair giving part of its time to that one subject might very well be put among the faculty, but I will not enlarge on this; but I think that the business side is not the only side. Business should have the smallest consideration from the dentist's standpoint, but Dr. Bouche, one of the last speakers, remarked that possibly if the Miller Memorial Fund was fully subscribed they might take it upon themselves to support the widows and children of deceased members, or something to that effect. Gentlemen, I think that the time for us to do that is to-day; that is our work. Our families and ourselves should come first. Charity begins at home; and if you are giving people—and you should not be practicing dentistry unless you are—perfect service, you have a right for your own sake and for your family's, and also for the good of the profession at large to expect a proper fee for the service rendered. We should get a fee according to the service, not according to the time. I thank you.

DR. CAMPBELL: I reply with a great deal of pleasure to this address of Dr. Garvin's. There is one phase of it that he touched upon that gave me much gratification; that is, the subject of the Miller Memorial. The scheme has ever had my strong sympathy from the very start, and I would like to see it continued on to completion. It is a small way, but a tangible one of showing our appreciation of the services rendered by Dr. Miller in years gone by, and at the same time the profession will receive a great deal of good from it. I would like to see it pushed forward. I thank you.

DR. O'NEIL: I am sorry you called on me, because I haven't anything prepared, but I was very grateful to hear the address made by Dr. Garvin, and there are so many good points in it that one cannot remember to simmer them down to touch on them.

PRESIDENT: I am pleased at the full discussion that this address has brought out. I am a little disappointed that my friend Dr. Matheson did not take part in this discussion. He is a little under the weather, and perhaps that accounts for it. Reference was made here to-day to a certain paper that he gave at one time within the last 50 years before some Winnipeg dentists, and personally, I had hoped, and it was the hope of the executive committee, that he could give that paper at this gathering. I hope that if the convention goes West next year that those present will remember that Dr. Matheson has a paper second to none, upon a subject he is very familiar with. I took great pains to write him as clear a letter as I could—had it typewritten—and registered in the mails, asking him to give his paper before this convention, and I received the following telegram from him:

"Letter just received. Thought you were a friend of mine, will forgive if not repeated. Impossible to write paper suitable, but willing to help discussion on same subject if another writes it. You overrate my ability. Last effort shortened my life by several years."

I am glad that Dr. Bush emphasized the reason for the greatness of Winnipeg's business men, and the explanation is, I think, well taken, and most applicable to the members of the dental profession. There is one point in my address that I had hoped would be dealt with, because it is one that I feel a great deal of benefit will come from, that is the question of our office assistants. I am not prepared to enter into this question at any length, but I believe that the girl in our office, who is capable of

meeting our patients; who is capable of making appointments, assisting at the chair and anticipating our wants; a girl who can prepare the patient, sterilize our instruments; who in the case of treatment will remove barbed broaches from sterilizing solution, wrap cotton on a number of smooth ones, prepare oval filling and mix fillings, etc., is a girl with an education, a girl who would make a success in anything that she went at, a girl who is deserving of a high place in business life. Some of our girls can do a very great deal in the laboratory. It is well also that she should know something about stenography, not necessarily a very fast one, but one able to typewrite your letters. In this connection I am reminded of a story told of Colonel Goethals, Chief Engineer of the Panama Canal, when he was head of a department at West Point. He gave his students this problem: A flagpole 60 feet long has fallen down. You are told by your commanding officer to put the flagpole back in place again. You have under your command a sergeant and ten privates, how would you go about putting it up? The men got paper and pencil and figured it out for some time and each one turned in a different answer. He said: You are all wrong; what they should have done is to have ordered the sergeant to have the men put up the flagpole.

Now we all often have to tell our assistants to do such and such a thing at a time when we would rather not be bothered. They should be trained to think for themselves. In fact, we should have assistants who are able to carry the "Message to Garcia."

PRESIDENT: There are one or two short items of business before calling on Dr. Buckley.

First, we are called by our constitution to determine the place of our next meeting. The general feeling a year ago was that our 1913 meeting should be held West of Winnipeg; I will leave that matter open for discussion.

DR. DOYLE, of Calgary: It affords me great pleasure on behalf of the men of Calgary to extend an invitation to meet at Calgary in 1913. I also have a letter from the officials of the city, which I will read. (Letters read). I will make a motion to the effect that we meet in Calgary in 1913.

DR. CALLUM: I will second that motion. (Carried unanimously).

PRESIDENT: It is now in order to appoint a nomination committee to nominate our officers for the ensuing year, the report to be brought in at the business meeting Wednesday afternoon.

DR. BOWLES: I will make a motion that the nominating of the committee be left in the hands of the Chair.

DR. HARWOOD, Moose Jaw: I second that motion.

PRESIDENT: I will nominate the following:—

MANITOBA—W. F. Taylor, Geo. C. Matheson.

SASKATCHEWAN—Dr. Harwood, Dr. Graham.

ALBERTA—Dr. Doyle, Dr. Callum. (I might say that Alberta is entitled to four).

ONTARIO—Dr. O'Neil, Dr. Mitchell.

PRESIDENT: I would call upon Dr. Bush to read the report of the Dental Clinic being held at the Hospital.

DR. BUSH: As all the city men will know, we started definitely some little time ago, and our secretary, Dr. Ross, of the association, obtained the following report from the hospital. (Report read).

A little explanation of this. The treatments are given as 71. It is quite easy to see that the hospital authorities would class all patients attended to under the head of "treatment"; as a matter of fact, that means in 99 cases out of a hundred, fillings. Of course, they were not all fillings. The hospital authorities asked us to give two days a week, one hour each day, and it was arranged that two dentists would go on duty every month. If you divide that among 243 dentists, you will find that in round figures, the men have treated in that hour an average of five cases each. That is not so bad for a beginning. The committee felt that it was up to them to take duty first, then the sub-committee. The whole committee now have done duty, with the exception of Dr. Campbell, who will assume duty in July.

Your mention of a dental college brings up this fact: This is only the commencement. What are we going to do? It is very evident that it is much beyond the possibility of the association of carrying it out through voluntary service. The response has been very good so far, but we shall have to do something more. (Thunder heard in the heavens). (Speaker pauses). I don't attempt to cope with the voice of thunder. I made a pause there out of deference to the thunderous applause, (laughter), but it makes good growing weather. The tender growing plant takes a little shoot upward and becomes a sturdy plant. We can compare this work with the growing plant. It may mean a lot of work, and as Dr. Garvin has said: "It cannot be done all at once," but it will grow to be a strong and virile work in the true and proper sense of the word.

MEMBER: What hospital have you been attending?

DR. BUSH: The General Hospital.

PRESIDENT: I am sure we are all interested in this report. Of course, the carrying out of the details is not a matter for this society to engage in, but a report from this committee is a timely report.

DR. CHRISTIE moved that a message of condolence be sent to Dr. D. A. Anderson on the loss of his little son.

DR. BOWLES seconded the motion, and asked that the motion include Mrs. Dalgleish and Dr. Jackson. (Motion carried unanimously).

DR. O'NEIL READS HIS PAPER—SEE PAGE 232.

DISCUSSION.

F. C. HARWOOD, D.D.S., MOOSE JAW.

Mr. President, and members of the Western Canada Dental Society:

In commencing the discussion on this paper, I do not intend to say very much, but just enough to start the ball rolling, as a member said this morning. I wish first to congratulate the essayist on the excellence of his paper. After hearing Dr. O'Neil last year, I knew when I saw his name on the programme, that we would hear just such an excellent paper as the one we have just listened to.

I want to say that since the children of to-day will be the men and women of the nation to-morrow, it is of vital importance that we treat them properly as they pass through our hands.

Our first duty to our child patients is to get their confidence, as the essayist has stated. To do that you must be very careful, first of all

never to knowingly deceive them. If you say you are not going to hurt them, when you know you are, and proceed to do so, just that soon does the child lose confidence in you. But that is not the worst feature. They lose confidence in you, but they lose confidence in the profession as a whole. You may be the first one they have had to consult, and they judge the profession by you. On the other hand, if you gain their confidence, you have made a good patient for yourself in the future, or for some other man in the place where they may in future reside.

I agree with the essayist that a dentist who has not a natural love of children, or who has not infinite patience at his command, should not attempt to treat children.

One way to gain the confidence of children may be employed before it is necessary to do any work for them. If the parent is coming to the office, and you know there are children at home between the ages of three or four to six or eight, ask them to bring them with them. Then, when the parents' appointment is finished, on some pretext or another get the child in the chair. That will help wonderfully to overcome their fear of the dentist and his office. I also am very particular, when the child is present, not to cause the parent much pain. If I know I have to hurt to any extent, I usually get the child in the visiting-room looking at pictures or something of the kind.

We talk about educating the people along dental lines, and I firmly believe that we can best accomplish that by starting with the children, for you know what we learn as children is not easily forgotten. I was glad to hear Dr. O'Neil advocate our teaching the child the use of the tooth-brush.

I agree with him also that many children are much more easily handled if the parents are not in the operating room. In fact I like, and get, many of my little patients to come to the office alone.

I think we cannot emphasize his point too strongly, about calling the attention of the parents to the first permanent molar. I find a very small percentage of them recognize them as permanent teeth, unless they are informed of the fact by the dentist. These teeth are so important that I consider we have a great duty to perform in this regard.

In regard to the filling materials Dr. O'Neil uses for children, he mentions only oxyphosphate of zinc and amalgam. I use two other filling materials, neither of which I would like to do without. Where I can get sufficient retention I insert copper amalgam, and prefer it to that made from the ordinary alloy of silver and tin. Where I cannot, or do not wish to get much retention, I have had excellent results with oxyphosphate of copper, or copper cement. It is wonderfully adhesive, as those who try to remove it from steel instruments can testify. German silver instruments are better for this material than steel, however. The copper in both of the above materials is supposed to have some therapeutic value, and I believe it has. At any rate, I get better results, or think I do, by using them instead of the ordinary oxyphosphate of zinc and amalgam in the posterior teeth of children.

I have just touched on a few points in the paper, and trust the other members present will add a great deal to what has already been said on this subject.

I wish again to congratulate Dr. O'Neil on his paper, and to thank you for the fine hearing you have given me.

DR. A. E. CLINT: Before speaking on this subject of the care of children's teeth, I wish to compliment Dr. O'Neil on the able manner in which he has handled the subject.

To me, it has always appeared that the care of the temporary teeth of the child, is just as important to their mental and physical development as the care in after life of the permanent teeth is to the comfort and welfare of the adult.

We all know that an adult who has a lot of decayed teeth in the mouth is badly handicapped, and suffers from them; so with the child improper conditions in the temporary teeth also affect materially the health and development of the child.

The use of copper amalgam for a filling for children's teeth, I think, "par excellence."

The question of the education in the laity of the importance of the dental organs, is receiving considerable attention at this time. I think that, perhaps, its importance in regard to children cannot be over estimated, and the ultimate examination of school children's teeth, will be the solution of the problem.

Thanking you, gentlemen.

DR. K. C. CAMPBELL: From a physiological standpoint this paper was a masterpiece. One can see that Dr. O'Neil has made a great study of the subject. In the matter of gaining the confidence of the child, in those cases where they come timidly perhaps through the mother's indiscretion in the matter, it is important that there be absolutely nothing done at the first sitting, other than making the child's acquaintance. I consider the time for bringing a child for examination as at two years of age, or shortly after. I have on record in my office, a card showing 10 or 12 fillings inserted for a child two years and three months old, mostly quite small cavities, but one large enough to be the cause of pain. The time is surely coming when children from an early age will be given prophylactic treatment at short regular intervals. At the present time it may appear for the well-to-do only, but in my opinion it will become more generally adopted.

Copper amalgam is excellent for temporary teeth, where amalgam can be used, for the reason that one need not be so careful to excavate all decay as you would for ordinary amalgam.

May 29, 1912, 2 o'clock.

Dr. Garvin in the chair.

PRESIDENT: Last year this society appointed an Educational Committee, the members of which were Drs. Wright and Bowles. Do we want a similar one this year? What is your wish in the matter?

DR. COLE: I move that the same committee be re-elected this year.

DR. E. FITZPATRICK: I second that motion. (Carried).

PRESIDENT: Are the nomination committee ready to report?

DR. MATHESON: I regret that I have been delayed in being able to give you this report, but it was necessary to call a second meeting of the nomination committee.

We beg to report that the officers for the ensuing year be as follows: President, E. M. Doyle, Calgary; Vice-Presidents, A. E. Jamieson,

Edmonton; F. C. Harwood, Moose Jaw; C. H. Walsh, Winnipeg; J. C. O'Neil, Fort William; Secretary-Treasurer, A. E. Heacock, Calgary.

PROGRAMME COMMITTEE.—A. D. Callum, Calgary; J. W. Clay, Calgary; L. Maxwell, Calgary; J. G. Roberts, Edmonton.

PROVINCIAL COMMITTEES.—Manitoba: C. H. Walsh, Winnipeg; J. H. Greenfield, Winnipeg; W. W. Wright, Winnipeg. West Ontario: J. G. O'Neil, Fort William; D. M. Mitchell, Fort William; C. Simpson, Port Arthur. Saskatchewan: F. C. Harwood, Moose Jaw; S. B. Graham, Moose Jaw; W. D. Cowan, Regina.

DR. MATHESON: I would like to move the adoption of that report, and also that the secretary be requested to cast but one ballot.

DR. TAYLOR: I second that motion. (Carried).

PRESIDENT: I declare these men duly elected to these positions. (Applause).

DR. BOWLES: There seems to be a lot of discussion as to whether we shall invite the Canadian Dental Society to Winnipeg in 1914 or not. I think the matter should be discussed now, and I would make a motion that the Dental Society of Western Canada invite the Canadian Dental Society to meet in Winnipeg in 1914, and that our present President and future President, who are going down there, convey that invitation to the meeting of the Canadian Dental Society in Hamilton.

DR. E. FITZPATRICK: I will second that motion.

DR. COLE: Would that interfere with the Western Canada Society meeting?

PRESIDENT: I take it that the matter could be discussed at Calgary one year hence, and it is likely that both meetings would be held at the same time. (Motion carried).

DR. GARVIN: I am sure that everyone would like to hear from our President-Elect, and I will call on Dr. Doyle. (Applause).

DR. DOYLE: Mr. President and Gentlemen: I am sure it affords me great pleasure to have the honor of being elected President of this association for next year, and also I am pleased that Calgary has been selected as the place for the next annual convention. We want all of you to be there when the meeting opens.

In this connection, I would like to have it discussed as to the best date at which the convention should be held. It does not make any difference to us at Calgary, except the 1st of July, when the Calgary Fair is on, and 2nd week in April, when the Horse Show is held, when there would not be sufficient accommodation in the town.

DR. CAMPBELL: I think that nearer the first of July would be better than the first of June, on account of the holiday season, and it is the time when the Mountains are in their glory.

DR. GARVIN: I think that the convention should be held sometime in the summer months, when advantage could be taken of a trip to the mountains—somewhere around the first of July.

DR. MATHESON: Personally as far as I am concerned, I would say any time from the latter part of May until the 20th of June.

DR. TAYLOR: We will take a special car from here, and we will have some place to sleep in, anyway—we might take two cars.

DR. CLINT: Mr. President, before going ahead with the paper of the afternoon, I am sure we have all enjoyed the meetings of the Dental Society at this session, and it affords me very great pleasure to move that

a hearty vote of thanks be made to the retiring officers and committees of the Western Canada Dental Society.

(The motion was seconded and carried with loud applause).

PRESIDENT: I think I replied to that last night. However, I again thank you for the very kind expression of your appreciation.

PRESIDENT: Dr. Taylor has suggested that I ask how many of our men from outside points, and from Winnipeg also, are going to be in the city to-morrow. If there is a sufficient number, it might be possible to arrange a clinic in which Dr. Prothero would participate. This room could be used.

(About six men stood up).

PRESIDENT: I now have the pleasure to call upon Dr. Buckley. (Applause).

(Dr. Buckley then proceeded to give his lecture, on the Surgical Treatment of Chronic Dental Alveolar Abscesses.

(A short discussion followed).

DR. TAYLOR: Before we break up this morning, I want to deny the allegation that someone has said about my having too much to say, because I think I have kept pretty quiet this year, but there is one duty that I would like to carry out before we adjourn.

We have had an extra fine meeting, and I think a good deal of the credit for making it such is due to the interest that Dr. Buckley and Dr. Prothero have injected into it. I do not think that we have ever listened to better papers on this subject before. They have taken their subject in detail and have explained it so clearly that there is not one of the members here who could not follow it. I think at this time that we should do something for them, and I would like to move that Dr. Buckley and Dr. Prothero be made Honorary Members of the Western Dental Association. (Loud applause).

DR. CAMPBELL: I would like very much to see Dr. Prothero and Dr. Buckley members of this association, whose boundaries extend from Lake Superior to the Rocky Mountains, and from the centre of the earth to heaven, and I second that motion. (Carried unanimously).

PRESIDENT: I have very much pleasure, on behalf of this society, in extending to you Honorary Membership in this association, and also a hearty vote of appreciation of the members of this association.

DR. PROTHERO: I am sure that I will cherish my membership in this society with more enthusiasm and pleasure than I do in regard to my connection with any other society. I thank you from the bottom of my heart. (Applause).

DR. BUCKLEY: I can only say again that Dr. Prothero has made my speech. (Laughter and applause).

Meeting adjourned at 4.30, to meet again at Calgary, 1913.

Secretary Dr. H. Greenfield reads minutes.

PRESIDENT: Are these minutes correct as read? If so, I will declare them adopted. (Carried).

PRESIDENT: Now, I would like to hear the Auditor's report.

Auditor Dr. Lyon R. Cole reads report.

DR. COLE: I move that the Auditor's report be adopted.

DR. CHRISTIE: I second that motion. (Carried).

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No. 6

DENTAL SOCIETY FINANCES

Just now, when so much is being said about managing dental practices, book-keeping and dental finances, would it not be wise to apply some of these principles to the management of dental societies? It is only within recent years that dental societies have paid the expenses of essayists, outside their own membership. Some societies offer liberal expenses. Few, if any, pretend to repay an essayist for his loss of time from his practise. The time is near at hand when every prominent essayist will not only be paid his expenses but for his time. The honor of reading a paper that has taken years to prepare is not sufficient. The membership ought to be willing to contribute to the value of what they receive.

One of the members of the Canadian Dental Association in discussing the business side of dental practise said that a dentist should have a regular audit, of his books; so that he might know his true financial

position. A dental society should not be less interested in its own financial standing than an individual. Besides this, every officer handling money for a society, should, for his own protection, demand an audit of his books. He should be careful to have an acceptable voucher for every payment, and no payment should be made without the order of the president, whose order should come from the executive. It must not be forgotten that the officers or executives whose books are to be audited, should have nothing to do with the appointment of the auditor. The members of the society must appoint the auditor.

The writer knows a treasurer of a dental society who puts in his own receipts for money, as vouchers. If fifty dollars is drawn from the treasury to pay the expenses of an essayist it is an easy matter to get his voucher. Besides, this, no treasurer should be allowed to pay money without the order of the president and the executive. The Ontario Dental Society has an educational committee which spends hundreds of dollars and no audit is made of the books, the accounts have not always been passed by the executive, nor moneys always paid by the order of the chairman or president. A financial statement was made at the last meeting which contained a statement of assets but no statement of liabilities. Such books of the society should be audited by auditors appointed by the society. The educational committee, should, for its own protection, demand an audit of its books.

In the May issue of this journal the dates for the Nova Scotia Dental Association appeared June 11 and 12. It should have been July 11 and 12, 1912.

ELGIN DENTAL SOCIETY.

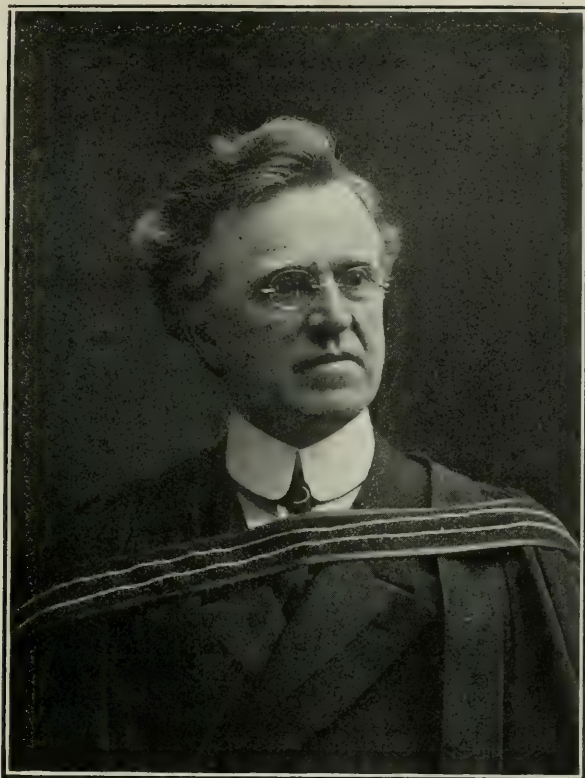
The annual meeting of the Elgin Dental Society was held on Monday, May 27, 1912. The following officers were elected: President, Dr. T. C. Trigger; Vice President, Dr. H. H. Way; Secretary, Dr. F. E. Bennett. A hearty vote of thanks was given to the retiring secretary, Dr. Way, for his untiring efforts in that office.

A DENTAL TRAGEDY.

The estate of \$1,053.85, left by Dr. Thomas Henry Graham, dentist, of No. 132 Dovercourt Road, where he died on March 10, goes to a niece in Calgary, and George S. D. and Mabel E. Graham, cousins, Toronto.

Dr. Graham began practice in Toronto in 1874, and continued in a busy practise until within a few days of his death a few weeks ago. He was unmarried, frugal, industrious and after thirty-eight years of hard labor, left an estate valued at little more than a thousand dollars. His savings went to promoters and stocks of little value.

DR. THORNTON RESIGNS FROM THE FACULTY



A. W. THORNTON, D.D.S., L.D.S., TORONTO, ONT.

Dr. Thornton's resignation from the chair of crown and bridge work in the Royal College of Dental Surgeons of Ontario comes as a great surprise to the profession of Ontario, and especially to his confreres on the faculty, and the students of the college. His many friends in the profession in Canada and abroad will deeply regret his having retired from dental teaching. A man whose whole life has been given to teaching or directing educational work could hardly have severed his connection with a work in which he is so deeply interested, without a great wrench.

Dr. Thornton has been an outstanding figure in the Canadian profession for a number of years. He has held many prominent offices in the gift of the profession. He has been honored at home and especially abroad because of his professional, educational, and literary attainments. As a public speaker he has no peer in the Canadian profession, nor are there any more brilliant speakers or teachers in any calling. There is no great banquet or gathering of dentists on this continent without Dr. Thornton being asked to take a prominent part. He has on two

occasions gone to St. Louis to give an after dinner address. He represented Canada at the great Black banquet in Chicago a year and a half ago. At every meeting of the International Institute of Dental Pedagogics for the past ten years he has made splendid contributions. His discussion of the president's address at the last meeting in Chicago was a masterpiece. On no occasion does he give such an address without receiving many letters of congratulation after returning. His address a year ago to the graduating class of the Chicago College of Dental Surgeons has since been mentioned as a model for such occasions.

Dr. Thornton's abilities in the technical branches of his profession have been quite as widely recognized as his literary attainments. Within a year he has read papers before the Ontario Dental Society, Buffalo Dental Society, Montreal Dental Club, Toronto Dental Society, Hamilton Dental Society, New York State Dental Society, besides delivering many addresses on oral hygiene to all kinds of political, social, religious and scientific gatherings in Toronto and its vicinity. Publishers are pressing him all the time to write a work on crown and bridge work. A publisher in England sent a special representative to call upon him. A year or so ago he half promised to begin, but pressure of other duties prevented. The dental text book commission of the Institute of Dental Pedagogics of the United States has prevailed upon him to write a text book on crown and bridge work for students. Much of this work is under way. During the last year Dr. Thornton has recast the whole plan of teaching the subject in dental schools, and hopes to follow the new scheme in his writings.

Dr. Thornton is a man among men. He is known in political circles as a good fellow and a ready and brilliant speaker, good debater and a keen thinker. He takes a prominent part in every political campaign, and has had the opportunity of being the candidate for the legislature on more than one occasion. He has held municipal offices and sat as chairman of the Board of Education for the City of Chatham for many years. He takes part in every movement for the betterment of mankind, economic, social, political and religious.

As a teacher in the dental college, he has always had an inspiring influence. No young man could be in contact with such a soul without getting an inspiration for good and a stimulus to play the game of life like a man. Young men find in him an example of high spirits, clear reasoning and lofty thought. A school without such spirits is a dead one. Its influence is soon forgotten.

The standing of any school depends upon the attainments of its faculty. It has been by the faculty the R.C.D.S. of Ontario that its present standing has been established and by them alone can it be maintained. Its management has been as a mill stone about its neck. Only men with great confidence in the future, supported by a strong will, can labor on day after day and night after night travelling from one end of the continent to the other to uphold the standing of the institution with which they are connected, without the support or sympathy of those who happen to control. One can sympathize with a man of high ideals and a keen sense of uprightness becoming disgusted with many things in the management of the school of dentistry of the Royal College of Dental Surgeons of Ontario.

Can the dental profession of Ontario afford to lose the services of

such a teacher as Dr. Thornton has proven himself to be? Can the dental profession of Ontario afford to lose the services of a man who has so often represented the profession with such distinguished ability, at home and abroad both in the profession and outside of it?

Dr. Thornton in his resignation says: "Under existing conditions, I feel that, to retain my present relation, to the work of the school, is quite impossible." Should the profession, the students present and prospective, not know what the conditions are, which, in the mind of Dr. Thornton made the continuance of his position on the faculty impossible?

Can the Board of Directors representing the profession afford to lose the services of Dr. Thornton without having a full enquiry into the conditions which made it impossible for him to continue his relation to the school?

If the Board of Directors are not interested in the reasons for Dr. Thornton's resignation, the profession are, so we respectfully ask him to make them public.

The following is a copy of his resignation:

Toronto, May 6th, 1912.

Board of Directors R.C.D.S.,

Gentlemen,—I hereby desire to resign the position I have held for the past several years, as Professor of Crown and Bridge Work, in the Royal College of Dental Surgeons.

Under existing conditions, I feel, that to retain my present relation, to the work of the School, is quite impossible.

Thanking you for many favors,

Believe me to be, Gentlemen,

Yours very truly,

(Signed) A. W. THORNTON.

RECENT GRADUATES LAVAL DENTAL SCHOOL

A. Barras, J. Beland, J. Bourdon, L. Boutin, E. H. Charron, Ovilá Cyr, L. De Guise, H. Julien, X. Laberge, A. Larose, T. L. Larseneur, H. Le Bon, P. A. Le Bon, L. Lemire, A. Leprohon, V. Levasseur, E. Precourt, A. Renaud, E. Seers, J. Veilleux, of Montreal, and Andre Millot, A. de Souffron, of Paris, France.

The following candidates have obtained the degree of Bachelor of Dental Surgery: E. Aucoin, E. Balthazar, M. Barbeau, R. Beliveau, S. Bertrand, A. Chamberland, J. Charest, A. Dion, A. Jinchereau, R. Lamontagne, J. Meek, A. Picard, F. Racicot, L. P. Verner, L. Suave.

The Laval University is actually erecting a beautiful building which will be ready for the October term. The new school will accommodate two hundred students. This school is the only one in America teaching exclusively in the French language.

A meeting of the dentists of York and Ontario Counties was held in the Prince George Hotel, Toronto, on May 17, 1912, when an organization was formed known as "The Central Ontario Dental Society." The officers elected were: Pres. Dr. D. C. Smith, Stouffville; Vice-President, Dr. J. W. Barker, Cannington; Secretary-Treasurer, Dr. H. N. Wilkin-son, Newmarket.

THE CANADIAN AND ONTARIO DENTAL ASSOCIATIONS MEETING IN HAMILTON

Altogether, the meeting was a great success. The members of the Hamilton Dental Society are to be congratulated for successfully managing the largest dental society meeting in Canada. The Brant Hotel, at Burlington is well situated for such a meeting, but it was too large a proposition for it to undertake. Although they had months of warning they were unable to accommodate more than half who wished rooms. The dining room service fell down badly. There were a large number of ladies present, which reduced the accommodation for the members. The meeting room was large and well lighted, but was at the top of the building, which made it difficult to get the members together. All the members being together for days made the gathering especially enjoyable.

The programme and the attendance were good, the discussions keen, but in some cases tiresome. The chair should enforce the rule of five minute discussions. Ten minute papers should not be allowed a half-hour. A full report will appear later.

WHAT THE CANADIAN ORAL PROPHYLACTIC ASSOCIATION HAS DONE

Future generations looking over history will take note of the accomplishments rather than those who accomplished. Just as we, in a dim way at the present time feel grateful because we are supplied with telephone, telegraph, cable communication, etc., that our houses are properly built and that our sanitary arrangements, particularly in large cities, are so efficient.

Those who are sufficiently fortunate to be responsible for the producing of better conditions want no greater reward than the knowledge that they have as far as in them lay, fulfilled their mission on earth by having done something for the benefit of their fellowman.

Imbued with these sentiments, the dentists who compose the Canadian Oral Prophylactic Association have always tried to further the cause of education and the good of the dentist without giving prominence to any member of the Association. They have forbidden the manufacturers of Hutax to use the name of the officers of the Association or of the committee responsible for the products of the Association in any form of advertising. In every way possible the Association has tried to assist other societies doing educational work to accomplish that which in their judgment was best.

Lest this retiring disposition of the Association should again be taken advantage of, it is wise to tell of a few things which have been done, and to show the necessity of the organization, also to forecast a few things which may be done.

One of the greatest accomplishments any Canadian dental society could hope to achieve would be to unite the dentists all over the Dominion in one bond of sympathy. This the C.O.P.A. has gone a long

way toward accomplishing. Without the aid of the various educational committees throughout the Dominion the work undertaken by the C.O.P.A. would have been impossible of accomplishment.

Every dentist who has recommended a package of powder or paste or a brush labelled Hutax has taken a part in the good work of the C.O.P.A., and let the fact not be lost sight of that he was not advocating a proprietary or secret preparation, but the best that could be produced by Canadian dentists, which is certainly in itself gratifying to any member of the profession.

When the Association was first formed there was no Educational Committee of the Ontario Dental Society, or if there was one it was in a dormant state owing to the fact, probably, that an Educational Committee without funds is in a very helpless condition.

As soon as the C.O.P.A. found that they were going to have sufficient money to do things, certain lines of work were planned. It was decided that dental educational pamphlets should be sent all over the country for the enlightenment of the public; that literature of an educational nature should be given to the dentist for distribution; that Public School inspection should be assisted in every way possible; that public lectures on Oral Hygiene should be arranged for, and if sufficient money were forthcoming, that works of charity and education, heretofore impossible of accomplishment, would be instituted and perpetuated.

Shortly after this programme was mapped out, one of the members of the C.O.P.A. was informed that a book containing some chapters on Oral Hygiene was being prepared for the Public Schools of the Province of Ontario. The C.O.P.A. Committee immediately undertook to see that the material contained in this book should be according to modern teaching on Oral Hygiene. Those who had the compiling of the book in charge supplied the Committee with proof sheets of the work. However, at this stage of the proceedings, Dr. Bruce, who was then President of the Ontario Dental Society, appointed a Committee, which included nearly all the members of the C.O.P.A. Executive.

After discussing the matter it was decided that the work undertaken would be better turned to the Special Committee appointed by Dr. Bruce for this purpose, and the C.O.P.A. dropped out.

At this time several pamphlets were in course of preparation for distribution to the public, and as may be seen by the *DOMINION DENTAL JOURNAL* of Vol. XIX., page 38, the Agricultural Department of the Ontario Government was prepared to publish and distribute these pamphlets. This was before the Ontario Educational Committee was appointed at the annual meeting of 1909. Anticipating that this Ontario Educational Committee would prepare pamphlets for distribution through the Agricultural Department, the C.O.P.A. decided that it would do nothing which would interfere with the progress of the said Committee; consequently it resolved not to utilize this Department of the Ontario Government.

A member of the C.O.P.A. then went to the Educational Department of the Ontario Government and obtained their sanction to send out the first pamphlet to all the teachers in the Province through that department. Ten thousand pamphlets were distributed to the teachers of Ontario.

Fifty thousand of these pamphlets were sent all over the Dominion at an expense to the Association of \$535, nearly the whole of which would have been saved had the Agricultural Department of the Government sent them out. The reason for adopting this pacific but expensive course was to avoid discouraging the Ontario Educational Committee in any way.

Unfortunately this work has not been done, the Ontario Educational Committee up to the present time having only sent out one pamphlet and having one more either in preparation or ready.

On invitation from Dr. Duncan Anderson, editor of the *Canadian Public Health Journal*, a C.O.P.A. Committee was formed to have articles prepared for that publication with Dr. A. E. Webster as Chairman and Chief Editor. Several papers were prepared and published. The intention is to send out as pamphlets those which are considered suitable for that purpose. This has not yet been done on account of lack of funds.

The C.O.P.A. has purchased a number of books containing public lectures also charts, slides and oral hygiene exhibits, which have been loaned to different dentists and societies for educational work. Up to the present time these have been used in over 200 lectures.

One of the best ways of furthering the cause of oral hygiene is by public lectures given by competent men. The C.O.P.A. paid the expenses of lecturers from Toronto to Winnipeg, from Toronto to Hamilton, from Cleveland to Toronto, Chicago to Toronto, and Toronto to Montreal.

Dr. Dowd was brought to Toronto from Cleveland under the auspices of the Toronto Dental Society, and the C.O.P.A. was glad to meet the expense incurred.

Largely through the influence of Dr. Dowd's lecture a Dental Inspector was appointed in the Public Schools and both the public and the profession have good reason to congratulate themselves on that appointment. The many benefits it has given rise to at the present time are only a faint shadow of the benefits which will in future be resultant.

The C.O.P.A. have been fortunate in having been of financial assistance to the Hamilton Dental Society, St. Thomas Dental Society, the Society of Western Canada, and the Ontario Dental Society through its Educational Committee. It is pleasing also to note that the Provinces of Nova Scotia and Quebec have been benefited through the assistance of the C.O.P.A. One of the crowning acts of the C.O.P.A. has been to furnish the public and the dental profession with tooth brushes which are superior to any heretofore available. Such men as Dr. Johnson, Dr. Darby, Dr. Hartzel, Dr. Doherty and a number of others, have been unstinting in their praise of the brush, and in our own country practically every dentist who has used them according to instructions cannot speak too highly of the medium size, small and especial lingual brush. One eminent dentist said he felt he had never before brushed the lingual surfaces of his teeth until he had used a lingual Hutax brush. In order to do as much good as possible with this brush, they have been supplied to the school children of Toronto much below cost. Several thousand have been so supplied. The Sick Children's Hospital is supplied at wholesale rates, besides this they receive

a donation of \$100 per year. There are many other institutions of the kind which will receive similar assistance when the finances warrant it.

As the Public Schools of Toronto now have dental inspection, the C.O.P.A. believed it wise to assist the Separate Schools along the same line, and for this purpose they contributed the money to a committee of dentists, supporters of the Separate Schools, to have a lecture delivered by Dr. C. N. Johnson, of Chicago, to the teachers and trustees of the Separate Schools.

A public lecture of this kind is very beneficial to those fortunate enough to hear it, but the publicity that dentistry gets through the public and the press does incalculable good all over the country.

Dr. Johnson's lecture was greatly appreciated; the hall was crowded and the attention most marked. The effect outside of the teachers who were there undoubtedly will be far reaching.

The foregoing are a few of the things the C.O.P.A. is doing, and with the sympathy and help of the dentists at large, such as we always hope to have, will assure a lasting benefit from the organization.

A society which has given to the public and the profession a dentifrice, the formula of which is known to the dentist, a tooth brush better than anything heretofore in existence, which has assisted in having the literature on oral hygiene in our schools according to modern views, has had published and delivered thousands of pamphlets to the profession and the public; has had papers on oral hygiene published in the official Public Health Journal of the Dominion; has financially assisted dental societies in Ontario, Nova Scotia, Quebec, Manitoba, Alberta, Saskatchewan; has been instrumental in having dental inspection in the Public Schools of Toronto and assured of a similar result for the Separate Schools through financially assisting the public lectures for that purpose, and supplied thousands of tooth brushes and mouth preparation to the poor; contributed to the alleviation of the sufferings of children through the Sick Children's Hospital, and which has endeavored in every way to elevate the standard and standing of dentistry, surely as a society has had and has at present some reason for existence.

Dr. A. A. McKenty, of Tweed, has gone to Peterboro, Ont.

Dr. E. Simmons, formerly of Didsbury, is now practising in Lethbridge.

Dr. G. A. Liscumb is practising in Tottenham, Ont.

Dr. H. W. Kalbfleisch, of Elmira, has gone to Berlin to be associated with Dr. Hilliard.

Dr. E. E. Hart has disposed of his practise in Lindsay. He has purchased the practise of the late Dr. T. Graham, Toronto. He will be succeeded in Lindsay by Dr. S. J. Sims, Fenelon Falls.

Dr. W. W. McPhee is now practising in Orillia.

Dr. E. C. Campbell, of Shelbourne, is practising in Saskatoon, Sask.

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PROFESSORSHIP VACANT.

Applications for the position of
Professor of Crown and Bridge-
work in the School of Dentistry in
the Royal College of Dental Sur-
geons of Ontario, vacant by the
resignation of A. W. Thornton,
will be received by the under-
signed up to June 30th, 1912.

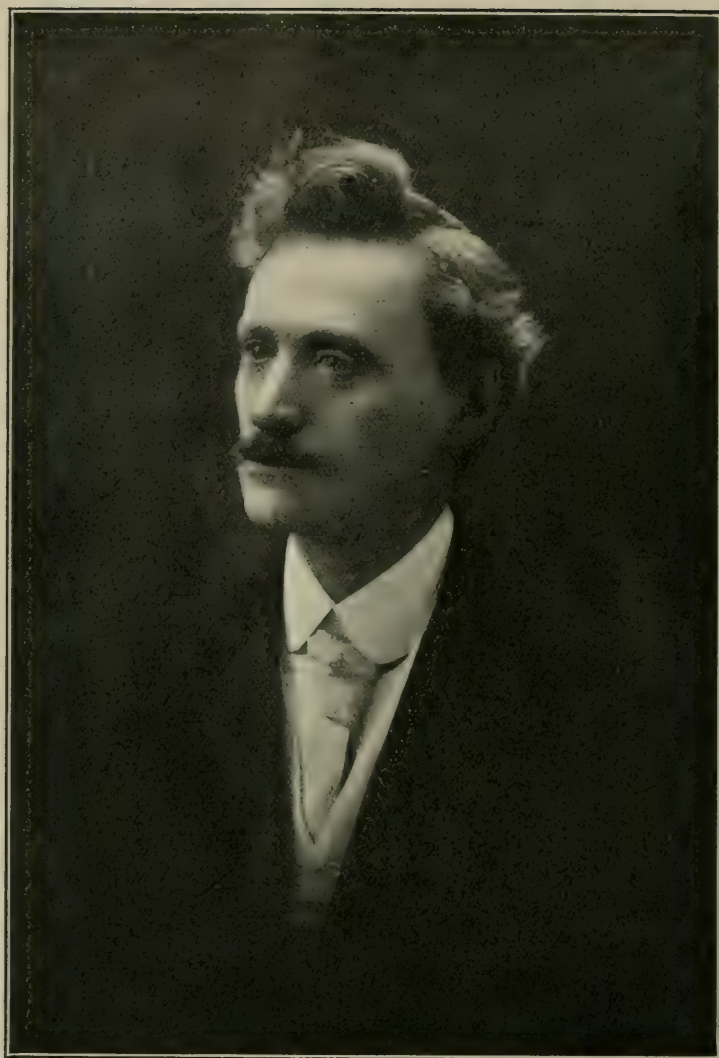
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President Canadian Dental Association.

Dominion Dental Journal

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Original Communications

INDICATIONS FOR THE DEVITALIZATION OF THE DENTAL PULP

A. E. WEBSTER, M.D., D.D.S., L.D.S., Toronto, Can.

Read before Elgin Dental Society, St. Thomas, May, 1912.

The dental pulp may require to be devitalized under the following conditions:

- (1) Pulp exposure.
- (2) Inflammation which is indicated by pain or hypersensitivity to changes of temperature.
- (3) Hypertrophic pulpitis.
- (4) Atrophic pulpitis.
- (5) Pulp recession.
- (6) Abscess of the pulp and ulceration of the pulp.
- (7) Erosion or abrasion.
- (8) Pulp stones and pulp nodules.
- (9) Pyorrhea alveolaris.
- (10) Crowns with dowels.
- (11) Abutments for bridges.
- (12) Posts for large fillings.

(1) MANAGEMENT OF EXPOSED PULPS.

Pulps exposed by decay in the anterior teeth and not paining are best devitalized by cocaine anesthesia, provided the cavity is of such a form that pressure can be applied. In the multi-rooted teeth arsenic is usually the most suitable, but if there is any reason for haste pressure anesthesia may be used with satisfaction. Pulps recently exposed by accident or by surgery may be desensitized by placing a few crystals of cocaine on the exposure for a few minutes and if sufficiently anesthetised removed at once; if not, a hypodermic needle may be passed a short distance into the pulp cavity and a solution of cocaine injected. If this fails or the pulp is too sensitive, a broach dipped

into arsenical paste may be pricked into the surface of the pulp or a fine shred of arsenical fibre slipped into the pulp chamber beside the pulp and the whole covered when possible with cement. If a pulp has been exposed from accident for some hours or days and has been irritated by changes of temperature, fluids of the mouth and food, the tissue usually protrudes from the cavity and is so exceedingly sensitive that it is impossible to touch it with anything. If the case is accessible at all a few grains of cocaine may be placed upon it, but the difficulty is, such cases pain so badly when exposed to the air that it is necessary to cauterize the surface at once with phenol to relieve the pain. This prevents the action of the cocaine. In some cases these pulps may be cauterized with phenol, gradually working it into and around the pulp until the pain stops and arsenic can be applied in the pulp cavity beside the pulp. If this method is not successful a general anesthetic may be administered and the pulp at once removed if an anterior tooth, and if a molar as much taken out as possible and the balance devitalized with arsenic. The Myers high pressure syringe may be used satisfactorily if there is good enough circulation in the pulp to carry the cocaine solution (see page — for technique of use of syringe). Injections of cocaine solutions into the gum tissue about the apex of the tooth will produce the desired result. Refrigerating sprays are too painful.

(2) MANAGEMENT OF INFLAMED PULPS.

As a general rule all paining pulps are inflamed and almost all pulps exposed from decay are inflamed. All pulps which are exposed should be devitalized (except, see page —) and all pulps which are inflamed or have pained for some hours should be devitalized. Pulps which are exposed from decay and are paining from pressure of food or other substances may be relieved by removing the pressure. If the pain is caused by salt, sugar, or fermentations in the cavity, it may be relieved by gently washing out the cavity with tepid water and removing any loose decay and applying an anodyne such as cloves, phenol, or cocaine. Relief is not certain unless a hemorrhage is secured. It is remarkable that sometimes if arsenic is placed upon the dentine of such a tooth the pain which has been going on perhaps for hours will be relieved in a short while. If the pain is not too severe to be borne an anodyne should be applied to the pulp and arsenic applied to the dentine, and sealed so that the patient cannot remove it. The pain may last for a short while, but it usually subsides in an hour or two. If the pain is severe attempts should be made to relieve it. Applications of cocaine, cloves, phenol and other tried remedies having failed to give relief, pressure anesthesia with phenol may be tried; this failing and the tooth accessible and the rubber dam in position, a spray of ethyl chloride will generally work admirably if the tooth is first covered with cotton and the spray applied gently, gradually removing the cotton until a full spray may be applied to the tooth. Then as large a round bur as will enter the pulp chamber, rapidly revolving in the engine, should be plunged into the pulp. This will

secure a free hemorrhage and relieve the pain and insure a certain and rapid action of the arsenic, which should be at once applied. General anesthesia is the most satisfactory for this operation.

Inflamed and paining pulps which are not exposed are often hard to locate. There are so many causes of pain in an unexposed pulp and they are so obscure and the symptoms are so bewildering to both the patient and the consultant that it is little wonder they are so often undiagnosed. (For full discussion of the pathology of the dental pulp see chapter —, page —.) Pains which are referred to the jaws, face, ear or over the eye and occur chiefly at night or when the patient lies down, or seem to have some connection with changes of temperature or taking food, may be looked upon as of dental origin. Few pains of this character are from any other cause. Pains which are from the pulp of a lower third molar are prone to be unlocalized. The patient may feel the pain of a pulp in almost any location about the head and face. Irritation in an upper tooth may be felt in the lower tooth or vice versa. The patient's convictions as to the location of the cause of the pain is of little value to the diagnostician. While the patient is often right in locating the cause of the pain, yet it is never wise to remove a good filling or cut into a sound tooth on such evidence. The dentist must satisfy himself from the history of the case, the subjective and objective symptoms as to the origin of the pain. Pulps which are actively congested are hypersensitive to cold and may be soothed by mild warmth. Pulps which are passively congested are soothed by cold and irritated by warmth or heat. Pulps which are hypersensitive to either heat or cold are in a pathological state. All persons' teeth are not equally responsive to changes of temperature. Each person has his own standard of sensibility. The sensitivity of the suspected tooth must be gauged by the action of similar temperatures on normal teeth in the same mouth. A tooth which is hypersensitive to cold and is relieved by mild warmth and has not violently pained over some hours need not be devitalized. Such a tooth should be protected from thermal shocks by drying it off and covering it with a varnish and administering to the patient a cathartic and one-grain doses of quinine or small doses of aconite, or belladonna. This treatment is often effective after large metallic fillings have been inserted close to the pulp.

If the pulp is hypersensitive to heat and relieved by cold a passive congestion exists or pressure from gases; in either case the pulp chamber must be opened and if the pulp is alive it must be devitalized.

If no cavity exists in the tooth a convenient location for reaching the pulp is selected and a hole drilled directly towards the pulp. During the drilling cold water or a spray of ether or ethyl chloride should be cast upon the tooth to reduce the pain of drilling and the shock of puncturing the pulp. Here, again, general anesthesia may be used. If a cavity exists the decay may be removed and an exposure obtained with large spoon-shaped excavators. As soon as an exposure is made relief comes. The anodyne and

arsenic may be applied with the assurance that there will be no further pain.

(3) MANAGEMENT OF HYPERTROPHIED PULPS.

An irritation which is not sufficient to destroy vitality is a stimulant. Pulps of the young are often exposed by decay and remain so exposed for years, gradually increasing in size until they protrude through the pulp cavity and almost fill the cavity in the tooth. These hypertrophies must often occur in the first molars. They have become accustomed to their surroundings and are not so easily irritated by chemicals, changes of temperatures or mechanical irritation. The patient avoids mastication upon the affected tooth.

It is difficult to differentiate a hypertrophied pulp from gum tissue which has grown into the cavity of the tooth either from the proximal surface or from between the roots. Gum tissue, which is usually irritated from lying upon the sharp edge of the cavity, bleeds as freely and is quite as sensitive to manipulation as the hypertrophic pulp. In both cases the tissue is pedunculated and cocaine crystals may be slipped under the flap to reach as near the neck as possible. In a few moments a fine-pointed excavator may be slipped under the tissue and the location of the neck made out. A thorough knowledge of dental anatomy will now be of assistance. If the operator is satisfied that the tissue comes from the root canal or the pulp chamber a few strands of arsenic fibre may be slipped under the flap and the cavity sealed with cotton and sandarac. If he is not satisfied more cocaine should be used and with a large sharp spoon-shaped instrument the tissue should be cut out of the cavity. When the hemorrhage, which will be profuse, has been controlled by hot water another examination may be made, and if he is not satisfied the cavity should be packed with phenol and sandarac for twenty-four hours, when all hemorrhage will have ceased and a diagnosis made. Arsenic may be applied to the stumps of the pulp as soon as they are made out and the case treated in the ordinary way.

(4) MANAGEMENT OF ATROPHIC PULP.

Owing to irritation or decrease of circulation a chlorosis of the dental pulp sometimes occurs. The fibrous elements increase. The tooth does not respond to changes of temperature. The pulp decreases in size. There is little or no blood and no sensation in certain locations, but excessive hypersensitiveness in other locations; neither cocaine nor arsenic has any effect. There is not sufficient circulation to absorb the drugs. The pain is exceedingly violent when touched with a broach. This condition often occurs under metal fillings which have been placed close to the pulp or on an exposure.

TREATMENT: The cavity should be flooded with pure phenol and gradually worked into the pulp cavity with a broach and finally forced in with vulcanite. No other drug is nearly so satisfactory as phenol in these cases. There is no use of trying either cocaine or arsenic unless a hemorrhage is obtained.

(5) MANAGEMENT OF RECEDING PULPS.

In a former section are given the reasons for the recession of the pulp. There seems to be a certain physiological recession of the pulp and if more than this occurs atrophy and death supervene. Pulps which have receded because of the nearness of a cavity or metallic filling or from exposure of dentine to irritation, are prone to become atrophic and die. Pulps which have been exposed may recede and live for years, but in no case does the original exposure become covered with calcific matter. If the cavity is opened a broach can be passed down the exposure and, though it may strike calcific matter if it is worked around, an opening will be found. It would seem that the membrane of eboris when once destroyed does not reproduce itself laterally, or if it does, it does not seem to have the power of depositing calcific matter. If when a filling has been removed and there is evidence of the pulp having been at one time exposed pressure anesthesia can at once be applied with success. The general rule has been laid down by some authorities that pulps which have receded to within one or two millimeters of the neck of the tooth should be devitalized. It has been observed that infections from pulps which were much receded or atrophic before death are especially severe and of the streptococcus variety.

(6) MANAGEMENT OF ULCERATION AND ABSCESS OF THE PULP.

A pulp which is exposed or almost exposed and becomes infected with pus organisms and as a result there is an exudation of pus from the surface, it is said to be ulceration of the pulp. If the infection has penetrated a layer of leathery decay to reach the pulp and pus is formed in the substance of the pulp tissue or around it, it is then called abscess of the pulp. If an ulcerating pulp for any reason becomes covered so that the exudate cannot get away freely, pain will supervene, which is *relieved by cold and increased by heat*. The symptoms of abscess of the pulp are the same as those of ulceration of the pulp, if the exudation of the ulcer is not free to get away. The pain of either is of deep throbbing character, and if it goes on for several hours the tooth will become sore to the touch. In fact if there have been several attacks the tooth will become sore and elongated almost as soon as the pain begins. In such cases all the pulp tissue in the crown of the tooth and perhaps some distance into the canal may be dead and an infected mass.

TREATMENT. Having made a diagnosis from the history, and tests of heat and cold and pressure upon the tooth, the treatment is essentially the same as an inflamed pulp. The pressure must be relieved. In case there is a cavity the decay should be removed and the cavity washed out with cool water. As soon as the pulp chamber is opened (which should be done with a great deal of care lest pressure cause excessive pain), pulsations of the heart can be seen in the liquid exudate or blood. As soon as these pulsations begin the patient will feel extreme pain. It is well not to continue to operate after an exposure has been made, lest the patient would think the

operating was causing the pain. If an abscess exists on the surface the exudation of pus will be followed by blood. The exudation should be wiped away and the patient assured that the pain will subside in a few minutes and not again return. Cocaine and cloves or phenol may be placed in the cavity for a few minutes while awaiting for the pain to subside. The cause of the pain is the stretching of the nerves back to their normal position after being compressed. It is sometimes difficult to know if the pus and blood are coming from a small portion of the pulp in the root canal or from the apex. If there is any doubt a broach should be passed up the canal, and if there is sensation in the pulp chamber or not too far up the canal a very small piece of arsenical fibre may be poked up until it is in contact with the vital tissues. If only a small portion of pulp at the apex is alive it is wiser to pack the cavity with phenol until the next sitting and then try pressure anesthesia, using phenol. Arsenic may be placed on an ulcerating or abscessed pulp in which the pressure has been relieved and a hemorrhage occurred with an assurance that there will be no further pain.

If there is no cavity in the tooth or a large filling to be cut through to reach the pulp chamber, it must be born in mind that the rotating drill may cause pain from heat or the jarring may cause pain to the pericemental membrane, each of which may be confounded with the pain of cutting sensitive dentine and might thus cast some doubt on the diagnosis. Small sharp drills should be used.

(7) MANAGEMENT OF PULPS IN PYORRHEA.

It is thought by many operators of long experience in the treatment of pyorrhea that better results are obtained when the pulps are removed. It is explained that the pericemental membrane gets an additional stimulation or nourishment when the pulp has been devitalized. In many cases of pyorrhea the pulp becomes irritated from changes of temperature or from chemicals because so much of the root of the tooth has become exposed. In multi-rooted teeth, one root may become the seat of pyorrhea until even the apex is reached while the other root or roots may be perfectly normal and secure in position. Pain may occur in the pulp of the diseased root, which will necessitate devitalizing of the pulp.

TREATMENT. A small hole may be cut through the enamel and arsenic applied for a few days and then a further cut made until sensation is reached, when another application may be made. At the next sitting the pulp will be devitalized if there has not been too much previous inflammation.

(8) MANAGEMENT OF PULPS CONTAINING CALCIFIC DEPOSITS.

Calcific deposits occur in the pulps of teeth at almost any age, but more especially in advanced years. Such deposits are an indication of a degeneration of the pulp, which becomes inflamed or sclerotic. Pulp stones are often associated with a pulpitis which is difficult to diagnose. They usually occur in teeth whose pulps are subjected to some form of irritation, as abrasions, erosions, exposures of necks or roots of the teeth, large cavities or

fillings. Teeth may have pulp stones in them for a lifetime and cause no inconvenience. It is only when degeneration has gone so far that death or infection supervenes that any treatment is necessary. The only certain diagnosis before the pulp chamber is opened is an X-ray photograph. The whole pulp may become a solid calcific mass surrounded by degenerated tissue which is exceedingly sensitive but which will not bleed. In single rooted teeth it is often cone shaped and any movement at the orifice of the cavity acts like a spear thrust into the nerves at the apex. In multi-rooted teeth the pulp chamber may be filled with one piece, while the canals may have several granules or be entirely free. The whole pulp may be literally filled with fine granules like grains of sand.

TREATMENT. The only treatment when any is necessary is devitalization of the remaining living tissue and removal of all of the contents of the canals. If the tissue becomes inflamed all the difficulties of devitalizing an inflamed pulp are present and in addition the presence of calcific tissue which will not absorb arsenic nor devitalize beyond the point of application. If the pulp tissue contains granular deposits no unusual difficulties will be met. If there are no acute symptoms dependence must be placed in applying the arsenic to the dentine for a long time. Pressure anesthesia will very rarely succeed. If acute symptoms are present and pulp stones are diagnosed, either local or general anesthesia are the only hope. While the pulp is thus anesthetized a rapidly revolving bur should be plunged into the pulp chamber and as soon as a free hemorrhage is secured arsenic may be applied with an assurance of no more pain and a fair certainty of devitalization. It may be advisable to pass a fine reamer up the canal if nodules are suspected.

(9) MANAGEMENT OF PULPS OF TEETH USED AS ABUTMENTS FOR BRIDGES, OR TO SUPPORT CROWNS OR LARGE FILLINGS WITH POSTS.

It has been observed that teeth which have been used as abutments for bridges and covered with gold caps, very frequently lose the vitality of their pulps. In fact it is believed by some that the pulp of every tooth which is covered with a gold cap or in which is placed a large metallic filling, should be devitalized, because sooner or later it will die. Such is a most radical view. No tooth which has lost its pulp will bear as much pressure, last as long, or feel as comfortable as if its pulp had been alive. It has been suggested that pulps die under gold caps and large fillings because the oxide of zinc used in the oxyphosphate contains arsenic. This view has not been substantiated by analysis of the oxides or oxyphosphates used. A more reasonable explanation of the death of pulps of the teeth used as abutments would be overwork of the abutment or a cavity in the tooth which reached too close to the pulp. In the case of single caps and large fillings the latter is most likely the cause. In cases of overwork of the abutment and cavities which go at all close to the pulp, it might be wise to devitalize. If the pulp is devitalized the patient will certainly not bring so much pressure on the

bridge and the abutment will last so much the longer and the bridge will be so much the less useful while it does last. Notwithstanding the arguments which have been advanced by such authorities as Hungerfor, Goslee and Bromell, the experience of a large number of careful observers is that no pulp should be devitalized which can be retained alive and even in cases of abutments, cap crowns and large fillings, better results are secured with vital pulps.

DISCOLORATION OF THE TEETH DURING DEVITALIZATION.

Other things being equal, the later in life devitalization occurs and the shorter the time the pulp remains in the tooth after it is dead, the less the chances are for discoloration. It is impossible to give a patient an assurance that a tooth will not become discolored after the pulp is devitalized. Teeth whose pulps are dead are always a different color from those having living pulps. The discoloration in some cases is very slight, while in others it is of a deep bluish black. Some teeth are so open in structure that the red blood cells seem to penetrate as soon as the pulp is devitalized. They become pink in color and no amount of bleaching will prevent them from finally turning black. If one tooth in a mouth turns pink by devitalization all the rest are likely to do the same if devitalized. If the pulp could be desensitized and removed without hemorrhage and the root and cavity filled at once, discoloration would not likely occur.

Dr. Baird, Canada, devitalized the pulp of a central for a young girl which turned pink and afterwards very black. The patient became discouraged with having conservative operations done and applied to Dr. Baird about fifteen years afterwards to have what teeth and roots remained in the maxilla removed. Dr. Baird, remembering the pink color which followed arsenical applications, determined before extracting to find out if the same result would occur if any of the remaining pulps were devitalized. He found that not only devitalization by arsenic caused the teeth to become pink, but also that desensitization by cocaine and pulp removal gave the same result. When the teeth were extracted they were sent to the laboratory of the Royal College of Dental Surgeons, where sections were made and examination under the microscope revealed enlarged tubules and an abundance of interglobular spaces.

If the pulp of an anterior tooth is to be removed it should be done as expeditiously as possible, allowing neither moisture nor any other substance into the canal or cavity which the operator does not intentionally put there. He should know what drugs and what treatment are the least likely to cause discoloration. If at all possible, cocaine anesthesia should be used. Blood should not be allowed to remain in the cavity. Dryness is the key to success. Drugs which coagulate albumen or leave a resinous deposit or are discolored from exposure should not be used. Phenol, chloride of zinc, and bichloride of mercury are objectionable. Colorless oil of cloves,

cajeputi or non-coagulating campho-phenique may be used as a mild anti-septic dressing if the canal cannot be at once filled. The root filling should be as impermeable as possible and the pulp chamber filling should be a yellowish white oxychloride of zinc. The cavity in the tooth should be at once filled. If this is impossible an impermeable temporary filling should be used.

METHOD OF MAKING LANTERN SLIDES FOR USE IN ILLUSTRATED DENTAL EDUCATIONAL LECTURES.

F. E. Bennett, D.D.S., L.D.S., St. Thomas, Ont.

Cut thin glass into pieces, 4 x 4 ins. Secure a sheet of gelatine, put into a large plate and cover with hot water, stir until thoroughly dissolved. When cool, dip glass into the solution, remove, drain off and dry.

Write or put any illustrations on the glass with ordinary ink. When dry, put passe partout (procurable at any book store) all around the edge of the glass.

If you wish to make the drawings or writing indestructible, lay a piece of glass that has no gelatine on it over the prepared slide against the ink side. Bind the two together with passe partout.



A Group of Buffalo and Canadian Dentists who played Baseball
at C.D.A. and O.D.S. Convention, Burlington, June, 1912.

Proceedings of Dental Societies

THE BURLINGTON CONVENTION

of the Canadian Dental Association, Ontario Dental Society, and Dominion Dental Council, held at Burlington, Ont., on June 3rd, 4th, 5th and 6th, 1912.

At two o'clock, on the afternoon of June 3rd, the President of the Canadian Dental Association, W. D. Cowan, of Regina, called the meeting to order, and said: I have much pleasure in calling upon His Worship, Mayor Lees, to address you. I might, however, tell His Worship that this is a combined meeting of the Canadian Dental Association, the Ontario Dental Society, and the Dominion Dental Council. The Canadian Dental Association, which probably I can speak of most specifically, was brought into existence a few years ago because we recognized that while a purely provincial society had its own sphere, it was not quite sufficient for a nation of the size and importance of Canada, and we, being imbued with that national spirit which characterizes so many in Canada, formed this association. We are Canadians from the Atlantic to the Pacific, and for that reason we wanted to make our profession in keeping with a nation to which we are all so proud to belong. I believe that every province in Canada, from the Atlantic to the great mountains, and I believe also British Columbia, will be represented here. We have also with us a representative from Great Britain, and we expect representatives from the nation to the south will be with us shortly and assist us in many ways. Our object is to build up a great association and a great profession worthy of the Dominion of Canada. We shall certainly be glad to receive a welcome from Mayor Lees.

MAYOR LEES: Mr. Chairman, Ladies and Gentlemen—I wish just for a moment or two I had the eloquence of your president. I am delighted with his remarks. My heart is full, but Dr. Thompson has told me what a struggle he is going to have, and I am in the same fix. There are some things peculiar about my coming to-day. A person hardly knows in this world what he is going to be up against some time, for here I am in another municipality. Because I happen to be the official head of the City of Hamilton, it is my duty and pleasure to give you a welcome to Hamilton, but here I am ten or twelve miles away from home, without any legal authority to give you a welcome here. I am very glad you have come. I think perhaps the Mayor of Burlington will swear at me if I commit any trespass, but we are all delighted to have you here. Another peculiar thing that struck me was, looking back a few years, who would have thought I should welcome a dentist. I thought it one of the worst ordeals that a man or woman could go through, was to go to a dentist. Sometimes I have got to the foot

of the stairs, and sometimes to the top, and then did not go in. Then the toothache used to stop when I got that near, which was another peculiar thing. But my dentist is such a pleasant conversationalist that I like to go. He asks me so many questions, but he has me so bound and gagged I cannot say a word. Aside from these difficulties, I am sure the citizens of Hamilton are glad that the various associations you have named, Mr. Chairman, are holding their sessions here. We feel honored, and trust your stay amongst us will be pleasant as well as profitable. The officers of the City Hall in Hamilton, are at your disposal, and if there is anything we can do to make your stay pleasant, or assist you in any way, we will be only too glad to have you call upon us. I do not know that I should in any way offer any advice for the management of this convention, but a little incident occurred just a week or two ago at home that I thought was pretty good for any convention of business men or professional men to think over. Two boys were bringing newspapers to me in the morning, and I had noticed the difference in the boys, because one came fairly early, and the other came fairly late. One morning I noticed that one boy brought both papers. Those boys had got together somewhere and had arranged things, and I suppose traded off so that one boy took the two papers to one house and the other boy to the other places where he went. Those boys were pretty clever headed; they were business men. They saved just exactly that much time and gave just as good or better service. Now, if the dentists or manufacturers or any other body of men get together and compare notes, I believe they will find it to their advantage and conducive to their success. I am sure a convention like this, with opportunities of discussing the different branches of the profession will be a benefit and an advantage to every member, and I think you are doing a wise thing in holding this convention. I think you are doing a wise thing in holding this convention so near the City of Hamilton as you have, and I hope you will come again soon. The next time you come, we will have no difficulty in housing you in the city. Plans are under way for two magnificent hotels, and besides that we have plans under way for a regular convention hall, so you will be made comfortable. You are in beautiful surroundings here, and I hope your stay will be very pleasant, and anything we can do to make it more pleasant, we will be only too glad to do. (Applause.)

The President called on Dr. W. G. Thompson, Chairman of the Entertainment Committee, to address the meeting.

DR. THOMPSON: Mr. Chairman, Ladies and Gentlemen—There is one thing I am certainly lacking in, and that is the ability to make a speech. Of course, you would not expect it from me, because I am not a politician, as I have heard that Dr. Cowan is.

A Voice: A statesman, not a politician.

DR. THOMPSON: I can assure you that we have been trying to do the best we can to entertain you, and to-morrow is the day we have set aside

for an afternoon's outing. I hope none of you will miss it. Since Mayor Lees has opened up the city to you, and he is the chief magistrate, he will, no doubt, make special arrangements with Chief Smith, to see that the boys who become unruly are cared for, and I think you will only be kept overnight and the next morning you can fix it up to the extent of about \$10. You have to cough up, as they call it, to the city coffers, you know (laughter). Now, all I can do is to thank you for the hearing you have given me, as you know I am not a speech maker.

MAYOR LEES: Dr. J. E. Davey, Chairman of the Aldermanic Reception Committee, wished me to express the great regret he had at not being able to be present. He has had the pleasure of attending this convention on his mind for a week or two, but he was called out of the city and it is impossible for him to be present. I am very sorry because the doctor does make up for what Dr. Thompson and I lack. He is eloquent and he would have given you a welcome in a fitting manner, so you can imagine the nicest things any person could say in welcoming you here and that would be Dr. Davey's speech.

The President called on Dr. W. R. Greene, President of the Ontario Dental Society, to take the chair.

DR. GREENE: Mr. Chairman, Ladies and Gentlemen: Those addresses of welcome are very pleasant and have given us a nice start off and put us in a good frame of mind, and now we will get down to work. The first item on the programme is the address by the President of the Canadian Dental Association, Dr. Cowan.

PRESIDENT'S ADDRESS TO THE CANADIAN DENTAL ASSOCIATION,
JUNE, 1912.

W. D. COWAN, D.D.S., L.D.S., REGINA, SASK.

Ladies and Gentlemen:

We naturally pride ourselves upon the advances made in dentistry by our profession in recent years. That dentistry has advanced in Canada as rapidly as in other countries is a matter of as great if of more local pride. That the Canadian Dental Association has contributed in a marked extent to our progress is unquestioned. Our progress justifies our existence as an association.

As a profession we have largely progressed by specialization. It has been by the concentrated mental effort and activity that progress has been made and success accomplished. If we review dental progress we will find that it has been in waves so to speak. We have taken up one particular feature at a time, concentrated our thought and energies upon it, until we had mastered it. It may have been porcelain or bridging or inlay, it mattered not, the whole profession centered their attention upon that one subject till we knew it. For a time preceding the complete concentration of thought on any of these subjects, we had heard suggestions

upon that one particular branch from a few leading minds, but it was by the concentrated mental effort that success was accomplished. Just as the discovery of vaccine, for instance, would have accomplished very little without an enlightened medical profession to apply it, so too would the various discoveries in dentistry been limited in their effect had not our profession taken them up specifically, and made a hobby of each until it became a fixed principle.

So much for the past, what of the present and future? If we have succeeded by specialization, what is there before us to-day upon which we are uniting our efforts and thought? A study must compel an admission that we have reached a pause. As we pause, however, we must admit hearing our leaders discussing preventative rather than curative dentistry, as a remedy for dental ills. If I am a correct reader of the times then my prophecy is that this will be the next feature that our profession will specialize upon. And we will master it as we have mastered all the others. It will be the most stupendous undertaking known to dental history. In its magnitude and possible benefit it far transcends anything that we have yet attempted. But our profession is not the kind to shrink at a task which offers tremendous obstacles, presents apparently unsurmountable difficulties, and contains no immediate hope of reward. We already know the human race will gain more from preventative dentistry if it can be made effective than they possibly can from curative dentistry, immensely beneficial though the latter has been. The object to be gained is what dentists have always sought. Because of this, in spite of the possible commercial loss, we will labor for the good of the human family and win out.

Preventative dentistry to succeed must have an enlightened public as an assistant, and our profession must enlighten the public. I doubt very much if dentists could have secured the co-operation of the public before this. There is a right time for everything. Many a good movement has failed for the time because it was ill-timed. A leader has always to create his own standing, before others will follow him. It is only recently that our profession has attained unto this standing. The literary training now required from all those who enter our profession, the schooling which they receive in the art of keeping cool under all circumstances, of thinking quickly and acting immediately in an emergency, is a training well calculated to force our members into the public eye, and compel recognition as leaders. It is true, I believe, that even yet some of our members have not a correct conception of their own endowment for public or semi-public office or of local leaders in thought, but as a whole, both the public and our profession have in recent years undergone an agreeable change in this respect with the result that to-day the people acknowledge our standing and are willing to be influenced by us within our proper sphere. The time then appears to be ripe for us to reach out to the people and say, "We

need your assistance in a movement for your benefit. Help us and we will help you."

Every mother in our country must be taught what preventative dentistry is. Every teacher in our schools must learn the effects of dental neglect. Even our medical brothers must be induced to require oral betterment as a necessity to their own successes. But we dentists, too, have our part. We must know the constitutional as well as the local causes and remedies. This means a very great enlargement of our educational requirements as well as of our share of usefulness. It depends upon us. Are we prepared to meet the increased demands upon ourselves and to prepare ourselves for those demands?

Already several committees are at work in different parts of Canada on this subject. Already the public owe to them a debt of gratitude. Already the public is showing a willingness to help. Already our leading dentists are preparing to accept the responsibilities of this advanced movement. How many of us are willing to be "leading dentists."

If "preventative dentistry" is worthy of the attention it is receiving, and is, I believe, about to receive, then in my opinion it is advisable that this association should deal with it in a business way and adopt a system whereby all portions of Canada will assist equally and be benefited alike.

Heretofore this association has existed chiefly as a convention association. It occurs to me that probably your executive should be asked to accept larger duties and be asked to assist in Canadian educational work, not to do educational work, but to see that this work is done in each of the provinces. This committee to be entrusted with the special duty of securing harmonious action by the various provincial incorporated bodies.

While I have no official communication on the subject, I am led to believe that the British Dental Association is desirous of establishing closer relations with the Canadian Dental Association, I understand that it is their desire that we should appoint one of our members to represent us at this assembly. This might be a matter for your consideration.

DISCUSSION ON DR. COWAN'S ADDRESS.

DR. FRANK WOODBURY: Mr. President, Ladies and Gentlemen: I consider it somewhat difficult to discuss an address of this character, comprehensive as it is, and yet to confine myself to the subjects dealt with by the president. It is with no small degree of satisfaction that I find myself again among my confreres in convention. Each biennial occasion brings with it increased pleasure, as the associations of each season of pleasant fellowship are hung in the hall of memory.

Lest no other opportunity should present itself, I want to express an appreciation of the splendid way in which the Ontario Dental Society has stood by the C.D.A., and made this occasion possible to the extremes of the country, beside adding immensely to the programme, and minimizing

the expense. I congratulate the officials of the O.D.C. and the C.D.A. in the evident success of their labors.

Nothing could afford me greater pleasure than to reply to the president's address, and comment briefly thereon.

We can doubtless trace some of the great forward movements of recent years in our country, and the crystalization of the dreams and hopes that have been treasured in the minds of many to the organization of the C.D.A., and co-operation of the Quebec and Ontario Dental Associations. The D.D.C. would have still been a dream, and the Canadian standards would have still been local, if in existence at all. Federal examinations and registration would not have been consummated. The steady progress toward uniform and higher provincial standards of matriculation and professional requirements would have been retarded, if not prevented. The work of the C.O.P.A. would have been circumscribed, if it had indeed been undertaken at all.

Much of the progress made in the establishment of dental surgeons in the army, the prestige and increasing regard with which our profession is held in the eyes of the general practitioners of medicine, the increased influence of our profession in the Federal and Provincial Parliaments, and the regard with which our statements are received by the civic authorities regarding the care of the mouths of the children of our schools, the establishment of some of our dental schools in Canada, whose courses of study challenge the world, and finally the movement has created a professional atmosphere throughout the Dominion that prompts every man who has ideals to be elevated, who bears within his breast aspirations for the up-building of his profession, and the success of our missions to our fellow-creatures. It has made the sordid and the selfish man feel meaner, and to understand that his attitude is low, and inspires the man of lofty purpose to dig his heels into God's earth, and with head erect stand a peer among professional men anywhere.

The president lays some stress upon "specialization" as the ladder upon which our profession is climbing. I would rather say specialization is the ladder upon which some members of the profession are climbing.

Invention, discovery and research are rather foundation stones in the temple to be reared, and it is only when the dental profession as a whole has tested each, and it has been subjected to the consensus of the conviction—not opinion—of the profession at large that it is put in place and trusted to bear the weight of the future superstructure.

It is the chalk mark of the profession at large which determines the place which an invention, discovery, or research work, shall take.

The field that dentistry itself occupies is so circumscribed that, barring "orthodontia" and oral surgery of a major character, there is little room for the specialist, for in the field of our activity, all our operations so

overlap, and are so related to each other, that every man must be qualified to perform all of them.

Any man who is capable of standing before patients with credit to himself and justice to his patients, should be in touch with the best methods in the treatment of "pyrrhoea" and oral prophylaxis. One would think by some things that are written that a person, in order to manipulate a set of scalers, and treat the pathological conditions of pyrrhoea, or practice preventive dentistry, must drink deeply at some secret spring to be endowed with spiritual touch, and wear a halo. We would be led if we had not moderate common sense to believe that a man that can prepare a cavity properly and insert and intricate gold filling, or porcelain inlay, although he may be able to construct a gold plate in the most artistic manner, yet he cannot without being overshadowed by some sort of afflatus, grind abutments, or manufacture and set a bridge.

It is not specialization that has builded our profession, stone by stone, plumb and four square, but it has been the conscientious and intelligent trying out of all that comes to us by the profession at large. It is here in this forum, and other society meetings, in our journals and offices that we get the experience and conviction that decides the fate and place of any movement or method.

The president gives a breezy outline of the place occupied by preventive dentistry. We shall have it administered in large doses during the next few days. I will therefore refrain from extended remarks. The president is right in saying that is the most far reaching movement of our time. We have hardly caught a glimpse yet of its significance. Some of us have been privileged to examine some hundreds of mouths and throats of children in our public schools, and are forced to believe that the conditions found are the prolific causes of disease and death. We can never have a healthy population with such pathological conditions in the human mouth.

The profession should be proud indeed of the splendid campaign of education which the committee of the C.D.A. and other associations in the Dominion have organized, and the sacrifices of time and energy they are putting into it. This is a splendid beginning, but to reach the boy and girl who are suffering there must be governmental and municipal backing, and an expenditure of treasure that would stagger us to think of.

The dental surgeon cannot be much longer expected to render gratuitous service in this cause. The public must be aroused. It is a problem worthy to engage our effort.

In the meantime the profession also must be aroused, man by man, and a profound study of the conditions and treatment of the mouth must be continued and made general, and combined investigation will bring a final satisfactory result.

At the present time we have awakened to the tremendous menace to

the public health, and in a very real sense are groping for a remedy.

This is not a time to dogmatize, but keep an open mind, receptive to the truth, and we shall one day discover it, but at the present, gentlemen, I have no question but what, as Mark Twain has said, "The larger part of our facts respecting many things are not true."

I have made no attempt at an extended address at this time. It would be both unwise and unfair and be a waste of time, as these questions will be discussed in detail by others.

PRESIDENT COWAN: I think it would be well to call on Dr. Greene for his paper, and then both papers can be discussed at the same time.

PRESIDENT'S ADDRESS TO THE ONTARIO DENTAL SOCIETY,
JUNE, 1912.

W. R. GREENE, D.D.S., L.D.S., OTTAWA, ONT.

Gentlemen: Each year as we meet in the interests of our chosen profession, we find that progress has been made; that there has been a steady and gratifying advance, both in achievements and in the status of dentistry. No profession has been blessed with more gifted or more devoted men than ours, and the splendid accomplishments of the past are but so many challenges to our men of to-day. Those entering the profession more recently have better educational advantages as well as the accumulated experience and knowledge which comes to us from the energy and efforts of the past. A strong foundation has been laid and it will be for us, and more especially the younger men, to watch most carefully and assist energetically in the carrying forward of this great work.

It may be that dentistry has almost reached high water mark in regard to ability to restore lost tissue, repair defects and correct irregularities.

Our materials and methods might seem to be almost perfect and leave little to be desired. While we cannot expect such marked development along these lines as in the past, still there is a place and a call for men in the realm of original research.

As has been recognized for some years past, the great work of our profession must be along the lines of prevention rather than correction or repair. This work must have its origin in the education of the people to realize the great importance of their teeth and to know the ability of the dentist to preserve these organs to them in such a condition as to enhance their appearance and aid in the mastication, digestion and assimilation of their food. They must also be aroused to the fact that caries is the most prevalent of all diseases and that it is doing more to undermine the health of the masses than any other single ailment. Yet caries, like other germ diseases, can be largely, if not entirely, prevented by proper sanitary and hygienic conditions.

There is no more important work for the dental profession to-day than

educational work. Yet there is no work where the motives of the profession are more likely to be misunderstood and questioned by the thoughtless. Because of this fact, we must exercise the greatest care, and supervise most carefully all our educational work.

The profession ought always to work with the end in view of having oral hygiene recognized as a health measure and undertaken by the health authorities. After the public is shown the need, the question becomes a public question. This has been the policy of the Ontario Dental Society and would be a very wise and safe policy for the local educational committees to follow.

Now that the Dominion Government has established a Conservation Commission and proposes to establish a Department of Health, I believe the Dominion Dental Association should form an educational committee to bring influence to bear upon these bodies to act in reference to this very important matter.

The Discipline Committee has been active and vigilant in the interests of the profession and the public, in guarding against unethical, unprofessional and illegal practice. In order to strengthen the hands of the board and this committee the annual fee has been raised from one to two dollars. This will enable the committee to extend its usefulness and to better protect the public from incompetency.

As touching compulsory indentureship, of late years so few licentiates were willing to take students that the board was compelled to conduct a summer session to provide for those students who could not secure a preceptor in ethical practice.

It was found impracticable to conduct a summer session unless it was made compulsory, owing to the uncertainty of the number who would attend. The board thought it would unnecessarily lengthen the term to make a summer session compulsory between the third and fourth terms. Hence they decided to discontinue the summer session and dispense with compulsory indentureship. Students who work in offices will still be indentured, but after this year no student will be compelled to indenture.

Ontario has led all the provinces in the Miller memorial fund, contributing \$700 of a total subscription of \$1,300.

At the last meeting of the Ontario Dental Society, the question of erecting a suitable memorial to the late Dr. Brodie was under discussion and it was unanimously decided to leave the matter in the hands of a committee, with Dr. Corrigan as convenor. This committee has gone ahead in faith and secured an oil painting of Dr. Brodie, which now hangs in the corridor of the Dental College. It is there as an inspiration to the students to make their life count for something above the ordinary dead level. This project has not had the hearty support that so worthy an object deserves. However, this committee will report.

Owing to the rapid increase in the population of our country, the

natural increase being greatly augmented by the influx of an ever-increasing throng of people from other countries, there is a danger of our profession becoming undermanned and unable to adequately cope with the demands for professional services. I think it becomes the duty of those of us who are interested in the future of our profession to keep a lookout for young men of ability to augment our forces. Ours is a profession which will require and should call forth men of ability.

DR. E. F. BUSH (First Vice-President): Ladies and Gentlemen: The two presidents find themselves in rather a peculiar position, both their addresses being before the meeting at the present time, and it devolves upon me to take the chair for the time. I fancy it might be better to finish the discussion of Dr. Cowan's paper and then go on with the discussion of Dr. Greene's. Dr. Cowan's paper is now before the meeting for discussion.

DR. J. NOLIN (Montreal): Mr. Chairman and Gentlemen: Unfortunately I was not present when Dr. Cowan's paper was read, but I listened with a great deal of pleasure to the discussion by Dr. Woodbury. I rather feel inclined to agree with Dr. Woodbury that the future of the profession lies more in research work than in specialization. Specialization, to my mind, of late has been over done to some extent. Specialization seems to close the door to further research by sweeping assertions that such and such are so, and are believed by the profession to be so. Now that the field of research is wide there is no doubt in my mind. Of late years quite a number of interesting inventions have come to light. Some of them, such as cast gold work, for instance, has been looked upon by the members of the profession as final. To my mind this discovery is only in its very infancy. Take bridgework for instance. It is sure to be changed within the next few years if research work is sufficiently attended to. Bridgework to-day is limited to a very small number of people who can afford to pay a sufficient price for it, a price sufficient to recompense the dentist for the trouble and the work he has to do. I rely on cast work to so simplify bridgework in the near future that the average dentist of average ability will be able to make bridgework for the poorer classes at a price that will be satisfactory and that will amply pay for his time, and still make bridgework attainable by the masses. My unfamiliarity with English, Mr. Chairman, makes it difficult for me to improvise, so that I think I will not speak longer on the question, because I will have to think it over how to say it in English. However, I am inclined to agree with Dr. Woodbury that research work is more important than specialization. I thank you. (Applause.)

DR. BUSH: A prominent gentleman on the other side of the line who professes to teach us all how to live longer, is credited with having said a short time ago that if we lived properly we should really grow younger every year instead of older, and upon my word, gentlemen, when I look

at one face at any rate in the audience here I am inclined to believe it, and I will now ask that gentleman to speak to us. Upon my word, he looks two years younger than he did two years ago. I refer to the Dean of the Royal College of Dental Surgeons, Dr. J. B. Wilmott. (Applause.)

DR. J. B. WILMOTT: Mr. Chairman and Gentlemen: At the call of the chair I stand up simply so that the gentlemen whom I have known for a great many years may see that I am here. I would like to impress upon the younger members of the profession not only by precept, but by example, the importance of attending these annual dental gatherings. The first Ontario Dental Society was organized in 1867, in the winter. The second meeting was held in July, and I was not present. I had the good luck to be in England at that time. One other meeting was held in Kingston, when I was ill. With the exception of those two I have been at every meeting of the Ontario Dental Association since 1867. (Applause.) It is a matter of very great pleasure to me to meet these gentlemen from year to year, and renew acquaintance. A great many speak to me whom I could not call by name, but it is a satisfaction to me to say that they look as though they were glad to see me. With reference to the paper that is under discussion I feel disposed to agree with Dr. Woodbury that what really elevates the profession is not its specialties but the excellence of the general practice. Specialists grow out of, or ought to grow out of, general practice, and must necessarily be restricted in numbers as compared with those who perform all the operations common to the profession, and certainly the position which the profession takes in the community and the respect in which it is held by the public at large depends not upon the few, but upon the many. Comparatively few of our clientele come into the hands of specialists, and I suppose those who do wish they did not have to. One of the proclivities of a specialist is to get deep down into the pockets of his client, and from that point of view I think I can express the opinion of the community in general when I say they are always sorry when they are obliged to fall into the hands of specialists. There is just one thing about the new things in dentistry which has impressed me for a good many years, and that is the tendency to run them to death. Porcelain work was taken up and abused—very badly abused. Bridgework was taken up and perhaps abused worse than anything that has been introduced in dentistry. I have said before, and I am here to say again, and stand by it if necessary, that the general public have paid more money for bridgework for which they got no value than anything else that has been paid in the way of dental fees. Now, there is a place for it, a perfectly legitimate place, valuable to the patient, and valuable, I suppose, to the operator in a sense, at any rate not disgracing the operator. But a very considerable percentage of it is a disgrace to the operator and a fraud on the patient. That simply illustrates the point that I am trying to make, Mr. Chairman, the tendency to run things into extremes.

Because bridgework was a good thing it was taken hold of and utilized where it ought to have been utilized, and degraded. Casting is following the same course. After awhile the profession will settle down to the good in all the new things, and avoid the evil. I do not think that we have very much to be ashamed of in the dental profession, Mr. Chairman. I think we are as progressive as the age in which we live. What is in the future we have not any basis in the past to base a prediction upon. The things which have come to us have come to us rather unexpectedly in the last few years, and probably the improvements in dentistry that are to come will come more or less unexpectedly. There is not any question as to the paramount importance of preventive dentistry. I wish we could interest the medical profession to an extent that they have not been interested in this matter. Those with whom I come in contact sometimes I try to impress with this idea, that in the whole field of preventive medicine there is no field which affords so large an opportunity to benefit the community as in the treatment of the mouths of children in their growing stage and when physical development takes place, if it takes place at all, where if it is not retarded the defect is never fully removed, and where the conditions of the oral cavity are such that the development of a perfect physical condition or fairly good physical condition is impossible, and yet this matter to a very large extent has never been touched upon and no attention has been paid to it by the medical profession. They have access to the children of a home where the dentist has not. I am glad to say that the presidents of both societies have touched upon this matter, and I presume that the feeling of the association will be to urge upon all those interested, and those in positions to do something in that direction, to give more diligence to it, even more than in the past. Mr. Chairman, I am very much obliged for the attention. (Applause.)

DR. BUSH: After this flow of oratory which we have heard I think it is only right that we should ask Dr. Thornton to say a few words.

DR. A. W. THORNTON: I am sure, Mr. President, that the reason is if you eat too much plum pudding you are apt to get a physical indigestion, and therefore if you are to indulge too much in the oratory to which you have referred you would have a mental indigestion, and as an offset you ask me to say something. I would like to offer a word of protest—kindly protest—against some of the things that have been said in regard to the tendencies which have developed in dentistry in the past few years. It is true that porcelain was overworked, and that disastrous results followed its unwise application. Let me say, however, that there is no halo and no special commendation and no special thanks to be given to the men who are more conservative and who did not take up porcelain work or any other of these specialties until the weaknesses of these lines had been discovered, and pointed out, and suffered for, by the

men who were enthusiastic in that line, and who have taught us the strong and weak points of these things. (Hear, hear.) To those men who were enthusiasts we owe a debt of gratitude, those who went ahead and blazed the way, and suffered as pioneers must all suffer, to reduce it to a condition and to a plane upon which we can all stand at the present time. So it is in regard to crown and bridge work. My good friend Mr. Nolin—I wondered when he said he spoke English indifferently, how would he speak if he had been taught the English tongue? He said that the time was coming when casting would make crown and bridge work adaptable and reachable by the average man in the profession and to the average person who must have the services of a dentist. Let me say, and say it after careful thought, careful as it is possible for me to give it, that there is no part of dentistry that will ever be of such a simple nature that it will not require the most intelligent service that the most intelligent man can give it. We are putting our work alongside of the perfect masticatory apparatus of the great geometrician and magician and mechanic of the world, and that is the standard, the perfect standard, by which our work will always be measured, and human frailties will enter in, and human frailties make it impossible that we should ever reach the standard of the conditions that already exist when we see the mouth in perfect condition; and so I say all honor to the men who have tried to bring about a standard higher than that which we have hitherto known. Let me say, too, as a member of the dental profession, the laity have not yet wakened up to what a dentist must know. There is no man on earth that I have any knowledge of that must have as wide a field of knowledge as a dentist, if he is going to give to the public the service which the public demands, and meet with any degree of success. Success and failure are relative, not absolute terms, and I say that every time I meet with a gathering of dentists I take off my hat to them. I am glad I am a member of such a profession, and we are going on to better things, but we cannot afford to detract from the men who have blazed the way in the past and who have taught us what success and failure mean. (Applause.)

DR. HARRISON (Brighton, Eng.): There are two points that will possibly interest you if I touch lightly upon them. I will take them in the order in which he mentioned them. It will probably interest you to know what we have learned in the Old Country in the matter of treatment of school children, which I believe is a subject just now receiving your earnest consideration. To give you a full idea I must briefly state the history of the movement. Several years ago the British Parliament passed a bill for the medical inspection of school children. Doctors were appointed to attend the schools and when disease or defects were found the parents were notified, and as you can readily imagine in nine cases out of ten the matter ended there. But this point arose. The dentists stepped

forward and said it is very ridiculous to have doctors to inspect the teeth of children, because the first and foremost point that came up was the fact that caries of the teeth was far away the commonest disease among the school children, and it was apparent that it was the most usual cause of absence from school. Very quickly many of the local authorities realized the truth of the arguments brought forward, and then inspectors were appointed. Just to give you an idea of the rather ridiculous mistakes that the doctors made, about three years ago, when I was house surgeon at the Royal Dental Hospital a mother brought a small girl to me stating that the school doctor said she must have four teeth out, that they were very bad. I examined her teeth and found as fine an example as I could find anywhere of arrested caries. They were pretty black but still nothing the matter. I had them treated with silver nitrate and sent them back to the doctor to ask him to look at them. I had a note from the doctor which said the first four molars required extraction and that they were very much worse than when he had seen them in the first place. (Laughter.) About three years ago a further bill was introduced permitting the local authorities to employ doctors and dentists to treat these children. The money primarily came out of the rates, later to be collected from the parents as far as possible. In many towns, and especially in the various self-governing districts of London, the idea was taken up, and the movement is growing daily. Of course, the result of this was that the hospitals could not cope with the work, and while the local governing bodies for the sake of economy did not like to go to the expense, the profession held out for school clinics, and I am glad to tell you that now up and down the country school clinics are being set by a qualified dentist paid out of the public funds, and they are to devote their whole time to the work. Of course, it is only just starting. At present a large number of teeth have to be extracted, but the future is full of promise. In addition to all this, at the schools a considerable amount of what you may call theoretical work is being done. At many schools the children are regularly instructed in the principles of hygiene. Tooth brushes are retailed to them at 5 cents apiece, which I may say is the actual cost price. There is a very small profit made on them. Pamphlets are distributed, which we look upon in the nature of tracts, and the children take them home, and the good may not necessarily end there. That is about all that is being done for school children, but in London some of the better known dentists are in their leisure time going around giving lectures to the general public, particularly amongst the working classes, with lantern slides, urging the necessity for a clean mouth. There is one man I know pretty well who devotes all of his time to that. He went around principally amongst the factory girls. He found sometimes what he had to say did not impress his audience as he would like, until he hit on the brilliant inspiration of pointing out the relationship between a good

complexion and a healthy mouth. Ever since then he says he has been listened to eagerly. The second point I wanted to speak about is the relation between the British Dental Association and the Colonial Dental Associations. For several years we have been desirous of establishing closer relations, and of course the most practical way it can be done is to send representatives to the various colonial conventions, but as you will readily imagine there are innumerable difficulties in sending representatives. We do not begrudge the money and the spirit is not weak, but it is difficult to find a man who can spare the time. As some of you are aware the International Dental Congress is to be held in London in 1914, and I am told by the British Association to invite as many as can to come. Your secretary will have full particulars as to dates, etc., as soon as they are fixed. We shall have with us on that occasion representatives from every part of the civilized world. Your neighbors from the south will send a large contingent I know. While officially naturally we cannot make any distinction between our guests, yet individually we shall be especially glad to see representatives from the colonies, and I can promise you an enjoyable holiday and I can guarantee you a very hearty welcome. (Applause.)

DR. BUSH: I was not aware that Dr. Harrison of Brighton, England, the representative of the British Dental Associations, was in the room. Otherwise I should have called on him before. We are delighted to have him with us. I had the pleasure of attending the meeting of the British Dental Association last year, and I fancy I was the only Canadian dentist in attendance. I had not the pleasure of meeting Dr. Harrison, but I met many estimable gentlemen, and I would ask you by your applause to show how much we appreciate his attendance here.

(Dr. Harrison was given a hearty round of applause.)

DR. THORNTON: This is the third of June, the birthday of His Majesty King George the Fifth, and I would move that we should rise and open our meeting with the National Anthem.

(The members stood and sang heartily the National Anthem, "God Save Our King.")

DR. COWAN (*closing discussion*): I am afraid, Mr. Chairman and gentlemen, that you have misunderstood my meaning as far as the use of one word is concerned. Those who followed me all spoke as though I had favored specialization in dentistry. I never mentioned it. What I spoke of was concentration. I did not mention individual specialization at all. I said that I did not think the profession as a body had concentrated its mind for a certain time upon a certain subject and had mastered it and then as a body, having mastered it, have stopped there. Men of our standing—because we are not satisfied with one conquest, we are bound to have more—are not going to stop simply because we have mastered one thing, we are going on to other things. Having mastered

one thing we take up other things and concentrate upon those again until we have mastered them. For instance, when I was going to college twenty-three or twenty-four years ago I never knew about making a bridge; I didn't know a thing about it. I will take that back. I remember one lecture delivered by the Dean in the college just as we were leaving. He told us about some company in Chicago, I think it was, who had a patent on some particular form of crown or bridge work. The patent, he said, required a continuous band, but, he said, you can easily get over that; all you have to do is to cut a slit in the band. Now, for Heaven's sake, what would we do to-day if we put a band around every tooth we put in. But I noticed one thing, that a few years after the entire dental profession had its mind concentrated on that one question, crowning and bridging. They went too far, but as Dr. Thornton has said, we had to go too far to find out our mistakes, to find out what we couldn't do, just as the medical men have to kill twenty men in order to know how to save one. So did our profession have to go too far before it discovered how far it really could go, and men who were not as honest as they might have been in our profession, who discovered their mistakes, still continued, but the ethical men, the men whom we want the profession to be guided by, stopped there and then—that is the ethical proportion of the reputable practitioners—and they have so mastered it we can consider it final, so what I believe to-day is that preventive dentistry is coming right before us and will require all our attention and will receive it in the next few years to come. That has been impressed upon my mind more forcibly of late in our own city of Regina. We dentists were not responsible for it, and I am satisfied the medical men in Regina did not do anything towards it, and I do not know how our school board came to think of it, but I do know the school board there has taken a very advanced step in the matter of educating the public and of seeing that the school children are properly treated. I do not say that it is the best system, but it is a step in the right direction. Our school board has employed nurses. Those nurses do not pretend to be dentists; they do not pretend to tell what should be done, but they do examine our school children and they do require every child in the school to come before them, and if they do not they cannot go to school. Those children are inspected by those nurses. Those trained nurses do not recommend them to go to any particular dentist, but they give them a card which the child has to take to her mother or father, and on that card, which is printed, is written in, "This child is suffering from diseased teeth; you are required to take him or her to your dentist," and then on the bottom of the card is a place for the dentist's signature, and he writes, "I have commenced to give this child the dental attention required." The dentist has to sign it, and unless that child brings that card back she cannot come to school. It has given us a great deal of work. Mothers have come into my office, and I fancy into

other dental offices in Regina, who probably were never in a dental office before, who never have thought of the matter of dentistry or of teeth as far as the child was concerned. It has had the effect of forcing the parents in the City of Regina to attend dental offices and secure dental service and dental advice. It is up to us then to do the rest. Now, I do not say that is a perfect system; I do not say it is the best that can be advised, but what I do say is that as far as we are concerned our school authorities without any inducement from the local dentists have started this thing which is to benefit not only the dental profession but also those children. Now, if the public up in the wild and woolly west have got wakened up like that, then I fancy that the same idea must have a pretty good footing in the more civilized portions of Canada. I think the tribute paid by Dr. Woodbury from the far east to Ontario is well deserved. It is simply that we in the west are feeling the effect of the work done down here. I think we ought to thank the civilized east for it. Now, I do not want to stand here and say anything more, but I do not want you to think that I am advocating individual specialization. What I do say is that if preventive dentistry is going to be the benefit to the public that we believe it will be, and to the profession as well, then it is time for us to wake up and get the question right down under a system so that we will be able to do the best work and do our duty under the present circumstances. (Applause.)

DR. BUSH: Gentlemen, I have been before you for the last half hour and I will now perform the last act for the present of my chairmanship. I feel already that the mental strain has shortened my life by some months, so I will now leave the chairmanship in better hands and ask Dr. Cowan to resume his duties before the next discussion takes place.

PRESIDENT COWAN called for the discussion of Dr. Greene's paper, and asked Dr. Reade to open the discussion.

DR. READE: Mr. President and Gentlemen: I am sorry I was not here in time to listen to the paper which I am sure was a very good one. Your closing remarks opened a subject that is very near to us here, and we could talk very profitably on it, but that will come up later on.

DISCUSSION ON DR. GREENE'S PAPER.

R. J. READE, D.D.S., L.D.S., TORONTO.

In his address, the president, Dr. Greene has shown his appreciation of the status of dentistry, by his keen insight into the underlying principals upon which the future of dentistry depends. His first point is well taken, and the rest of the address deals with the manner in which that end may be obtained. I refer to the statement that our ideal should be prevention rather than correction. In order to show how this may be brought about, Dr. Greene proceeds to elaborate the statement that "There is no more important work for the profession to-day than educational work." But,

he says, in prosecuting this work the motives of the profession may be misunderstood. I think that we should not pay too much attention to the opinions of others. Many a good man has proved a failure just on this account. He is afraid to make a new move, because a departure from common methods always provokes criticism. The first endeavor is to try and assure oneself that this endeavor is in accordance with the best interest of man; that being settled, a bold and determined effort forces administration and appreciation. Therefore I would say take up educational work, do good, and do not mind criticism. And more than that, if you do not seek for approbation, you will certainly be rewarded with the good opinion of your countrymen.

I cannot refrain from expressing the satisfaction it is to me to learn of the deep appreciation our president entertains of the efforts—I was about to say, but accomplishments is the correct word—of the Educational Committee of the Ontario Dental Society. During this convention its report will be placed before you.

The work of the Discipline Committee, as pointed out by Dr. Greene, has been productive of great good to the profession, and through the dentists to the public. For if the profession is kept free from questionable methods the people must necessarily be the gainers. The work of the Discipline Committee is difficult, and those who force the law necessarily gain the ill wind of those who are corrected.

With reference to the abolition of the summer session, I often wonder what the students do during their long summer vacation.

Passing to the section of the address relating to the Brodie Memorial, I was surprised to learn that the committee had had great faith, and the portrait of the late Dr. Brodie was now hanging on the walls of the college. I am one of that committee, and this is the first I heard of it. I am sure it would be interesting to learn who ordered the portrait, and how many of the committee were consulted, and if the artist is still waiting for his pay.

Next the president touches on a subject which deals with the whole Dominion of Canada. We can readily understand why he was lead to do this; it is because he is a citizen of Ottawa, the seat of the Dominion Government. The subject of a Dominion Educational Committee is one that calls for the most serious consideration. Dr. Greene's suggestion that it should act in conjunction with the conservation committee of the Dominion Government is indeed a brilliant idea.

After dealing with the work along educational lines, the president ends with expressing a logical fear. The work of education, of necessity increases the demand for dental work. This fact, as pointed out, together with the rapid increase of population, is likely to confront us with a serious problem. Who is going to do the work? It must be done. If we wish the Government to support us in our efforts to prohibit all but graduates

from practising dentistry, then in return we must see to it that there are sufficient graduates to take care of the dental needs of the province.

Now, gentlemen, I have opened the discussion. I am in hearty accord with the views of the president. I could not find fault with them, so I had to agree with him. I cannot close without congratulating Dr. Greene not only on the subject matter of his address, but also on the masterly order in which he arranged his facts.

DR. JAS. M. MAGEE: Mr. President, I thought all that was necessary to say from the east had been said by Dr. Woodbury, and while Dr. Woodbury has not consulted me about what he was going to say, if he had consulted me I think I would have been proud to give him the exact words he used in his address. Dr. Woodbury and I have had many a fight and we are quite willing to call it quits. I cannot agree with the last speaker altogether. He seemed to have rather a pessimistic vein. While he says he agrees with Dr. Greene in the first part of his address he seems to oppose him in what he has been stating. I am not in a position to criticize the paper as it deserves, and therefore if you will kindly permit me I will let somebody else who has perhaps followed it a little more closely say what he has to say.

DR. H. M. GARVIN: Mr. Chairman and Gentlemen: One point that impresses me very much in Dr. Greene's splendid address was this, that I was told this morning, or had my own opinion corroborated by Dr. Webster, that the number of men that were being graduated from our dental colleges in Canada in one year at the present time amounted to about 75, and on the other hand humanity is flocking to our land by tens of thousands, and I am glad there was a note of warning in that address in regard to not having a sufficient number of dental practitioners to meet the demands that are going to be made upon us, demands that will be made more strongly than ever before in the past, as the physicians are waking up to the fact of what dentistry means to humanity, and I believe humanity is only beginning to realize the importance of our work, and when that time comes we will not have sufficient dentists and something will have to be done. If we do not take the first steps legislation will be enacted to make us either reduce our standards or obtain more men. If we take the first step to secure the type of men we would like to see in our profession I think that a great deal of good might be done.

DR. C. A. MURRAY: Mr. Chairman and Gentlemen: I must say that I have approved of the manner in which this meeting has been conducted to-day. We have had a very nice address indeed from Dr. Cowan and a very nice one from Dr. Greene, and good criticisms by Dr. Woodbury and Dr. Reade, but they have so mixed me up that I am afraid if I commenced to criticize either one I might be criticizing the other. However, I will not weary you with very many remarks. There was one thing said in regard to specialization. Specializing, I consider, is all right as

far as it goes, but I think it is up to the general practitioner to become proficient, and he certainly has got to be a specialist in all the different phases and branches of dentistry. In the remote districts is where it is the hardest to practice our profession. We cannot send a patient to the large cities such as Toronto and Hamilton, where they specialize; we have to do it ourselves. I know a great many here have to do it themselves. Now, while there are many other things that might be spoken of, I certainly do not feel competent to criticize, and I do not think that I should take up time in saying anything more at the present time.

DR. W. C. DAVY: Mr. President: It is not my intention to enter into the discussion of either of these papers. The one point which impressed itself most strongly upon me possibly has been the reference made to an educational committee to have control, or whose regime was to reach throughout the Dominion of Canada. The organization of such a committee is, I believe, a most important matter, and one which should be looked into by us at the present time. The educational work of the different societies throughout the Dominion in the different provinces we shall hear of later on, but thus far our ideas and our aims have been heterogenous. We have not had any unified effort from one central body, and I believe that if some action could be taken at this convention to make out efforts more united and to make them widespread throughout the Dominion that it would be productive of a great deal of good.

DR. MAGEE: In connection with these two papers that have been read and the address by Dr. Harrison, is this a proper time at which to suggest names for representatives or delegates to the British Dental Convention which meets in Great Britain in 1914?

PRESIDENT COWAN: I think it would be better to leave that until our business meeting.

DR. GREENE (closing discussion): Mr. President and Gentlemen: I have very little to say. There has been very little adverse criticism. The only thing perhaps that Dr. Reade attacked me about was being a little timid for fear that our motives might be questioned. I always think it is a little wise to be on the safe side and not appear to be pushing ourselves forward. It seems to me it is wise to conduct our campaign so that the public will know it is in the public interest and that we are doing it unselfishly; that we have all the work we can do really ourselves, but it is for the good of the general public that the educational campaign is conducted. I think we should see to it that our motives are beyond question. That was my only object in bringing that question forward. I do not think that Dr. Reade was pessimistic. There is really a danger, I think, of our profession becoming undermanned unless we see to it that the young men are shown that there is a place and an opportunity for them in dentistry, and that it is a calling that is worthy of the best that is in them. I think it is for us to put this matter before the men who we think would

be good men to fill the ranks of dentistry.

On account of the lateness of the hour, on motion by Dr. Thornton, seconded by Dr. Woodbury, it was decided to postpone Dr. H. B. Hartzell's paper until the evening session.

(The balance of the report of the Burlington convention will appear in the August issue.)



From left to right—Standing—Dr. E. R. Hart, Sackville, N.B.; Dr. C. A. Murray, Moncton, N.B.; Dr. J. M. Magee, St. John, N.B.; Dr. F. W. Bachour, Fredericton, N.B.; Dr. Thompson, Moncton, N.B. Sitting—Dr. G. F. Bush, Winnipeg, Man., President of Canadian Dental Association; Dr. F. C. Bonnell, St. John, N.B., President of New Brunswick Dental Association.

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No. 7.

CANADIAN DENTAL ASSOCIATION CONVENTION IN WINNIPEG, 1914

It is now generally known that the next convention of the Canadian Dental Association will be held in the gate-way city to Canada's Great West. Already men are planning not to miss what will be an unusual gathering in many ways, of our profession. Even now the machinery is being set in motion, which will insure this convention of being one of the great epochs in the onward and upward march of Dentistry. That it will be of a national character, yes, even of an international character, is not doubted by a single Western man. It is assured that the Dental Society of Western Canada, which meets in Calgary in 1913, will unite with the C.D.A. in Winnipeg in 1914. Some strong men from our Eastern provinces are seriously considering having their local conventions merged in this greater one on this occasion. Leading men in Ontario are debating a similar move, and we trust the vote will be in favor of union. We want every man,

and every group of men associated with local conventions, or not so associated, to give themselves up to this one thing. We cannot afford to go into competition with any one of you, nor can you afford to compete with us.

A feature of this great gathering will be class reunions and an effort is being now made to get classes organized.

The railway officials will be at once approached, regarding excursion rates through the Canadian Rockies to Vancouver, also to California and Alaska, for all delegates.

The profession will be frequently advised of further developments in our plans. Arrange now to take your holidays somewhere in the West and to be a delegate at the Canadian National Dental Convention in Winnipeg in the summer of 1914.

M. H. G.

THE BUSINESS SIDE OF THE CANADIAN PROPHYLACTIC ASSOCIATION LIMITED

The lack of an assured income has badly handicapped nearly every educational committee. It has never been found possible to raise sufficient money for dental educational purposes by means of subscriptions either from the dental profession or the public.

The educational committee of the National Dental Association of the United States experienced this difficulty, and was forced to accept donations from the Manufacturers' Club in order to carry on their propaganda. They were censured by the Association for accepting this money, were accused of commercialism, and instructed not to receive any more donations from such sources. Though quick to find fault with the committee, the members of the Association were not so quick to put their hands in their pockets and make up the necessary amount required to carry on the work of the committee. Since then the work of that committee has almost been at a standstill for lack of the necessary financial assistance.

Apparently the educational committee of the Canadian Dental Association, viz., the Oral Prophylactic Association, is the only one which can depend upon a regular income of any dimensions, with which to carry on its work.

The income is derived at no expense to the members of the Canadian Dental Association, and at no extra expense to the general public. The latter are being supplied with tooth preparations and tooth brushes more reliable than those which were previously on the market and at the regular standard prices which have prevailed for years. Although these articles actually cost more to manufacture than most other goods of a similar kind, yet the public are paying no more for them. The Canadian Oral Prophylactic Association collects a royalty on each package of paste and powder, and on each brush sold by the manufacturer, or agents. The Association

does not deal directly in the manufacture or sale of either tooth preparations or tooth brushes, but simply controls the formulæ and patents and collects the royalties. These royalties are returned to the public in educational work for their benefit, thereby training them in the proper care of their teeth for the benefit of their health. The directors, shareholders and members of the Association are distinctly prohibited from receiving any money for their own personal benefit or use; therefore all the income of the Association must revert to the public either in educational or charitable work.

The results already accomplished in educational work by this committee would have been impossible without the aid of a regular income which could be depended upon. Local educational committees in various parts of Canada have been assisted by this Association, either by money grants or by the loan of lantern slides, charts, etc., for lecture purposes. Over two thousand dollars have already been expended in this way. No reasonable request for assistance of this kind will be refused so long as a reasonable accounting of moneys spent is given, and so long as the funds of the Association will permit it.

More money has been available each year, and the amount of the annual income is bound to increase year by year as more and more dentists appreciate the aims of the Association and the merits of its preparations.

The mouth preparations and brushes are the best available according to the present state of our knowledge on these subjects. If anyone can demonstrate to the Canadian Oral Prophylactic Association wherein we can improve on anything, we are quite willing to do so, and if anyone can suggest any better or more equitable way of deriving an income for this dental educational work, we will also be glad to hear of it.

Yours faithfully,

THE CANADIAN ORAL PROPHYLACTIC ASSOCIATION, LIMITED.

ADDITIONAL SUBSCRIBERS TO THE BRODIE MEMORIAL FUND.

W. H. Doherty, Toronto; F. N. Badgley, Toronto; G. G. Hume, Toronto; W. G. L. Spaulding, Toronto; A. J. Broughton, Toronto; A. W. Thornton, Toronto; T. N. McGill, Toronto; F. C. Husband, Toronto; A. W. Ellis, Toronto; A. Day, Toronto; C. B. Scott, Toronto; A. A. Smith, Toronto.

Reviews

The Prevention of Dental Caries and Oral Sepsis.—Being the Cartwright prize essay of the Royal College of Surgeons of England for 1906-1910, with some additions, by H. P. Pickerill, M.D., Ch.B., M.D.S. (Birm.), L.D.S. (Eng.), Professor of Dentistry and Director of the Dental School in the University of Otago. Bailliere, Tindall & Co., 8 Henrietto Street, Covent Garden, 1912, London.

Below are a few quotations from the book, which will indicate its scope:

THE DIETARIES OF MODERN CIVILIZATION: THEIR ERRORS AND CORRECTION.

Attention has often been directed to the general "softness" which characterizes modern diets, resulting in a lack of sufficient stimulus to the jaw-bone—therefore in a crowded and irregular state of teeth, and hence in a predisposition to caries. The elimination of all fibrous elements from food, too, probably tends, as Wallace* has pointed out, to the increased lodgeability of foodstuffs, by robbing them of their detergent action upon the teeth. But, as has been shown, the inclusion of a large element of cellulose in foodstuffs does not of necessity prevent them from lodging and undergoing fermentation.

It does, in some cases, reduce the acid production, but the reduction bears no relationship to the amount of cellulose present.

There is another characteristic, however, of our modern dietaries, which has been overlooked. I refer to its comparative non-sapidity, its usual neutral or alkaline reaction, and its general uniformity, all of which are properties which have been shown to be incapable of reflexly exciting a sufficient secretion of saliva to keep the mouth free by natural means from fermentation.

One has only to reflect for a short time, to come to the conclusion that the substances of which we consume most are those which have the least taste. In fact, paradoxical as it may seem, modern communities have acquired or developed a "taste" for tasteless things. This "taste" is not evolved; it is, I believe, acquired by a process of training and education on the part of each individual. Compare the natural uneducated "tastes" of a child with those of an adult. The child will in all cases select the most sapid substances, and eschew the insipid ones as a rule, much to the horror of its parents. Moreover, if a child be allowed to exercise its own uninfluenced choice, it will almost invariably be in the direction of a substance having an acid reaction. It is the parents who, by constant training and

*"The Physiology of Mastication," London, 1903.

insisting upon other articles of food being eaten, eventually produce in the child a tolerance of insipid substances.* This is done in all good faith by the parents for the child's health; it is prevented from eating substances which they know would in themselves produce gastralgia and dyspepsia. But it is entirely a gratuitous assumption that a like result would be produced in a healthy child by the consumption of such articles in amount proportionate to its age.

The digestive secretions of the parents have become vitiated and depressed through long years of depression or maltreatment. A normal child's are in a natural condition, and adapted to deal with food in a natural form. I have frequently noted that very young children will deal with acid substances like fruit and salad quite successfully, yet a *proportionate* amount consumed by adults causes considerable discomfort.

It is within the knowledge of all, too, what enormous proportions of comparatively sour fruit may be consumed by the schoolboy with impunity.

If the salivary glands are in a state of proper development and excitability, all the ordinary natural acids should be rapidly *neutralized*—if not before being swallowed, at least almost immediately afterwards, by the increased after-flow of a highly alkaline saliva. Not only is the "education" of the reflex salivary mechanism thus neglected, but salivary secretion is actually depressed by a very much increased consumption of such articles as tea and meat. There is no doubt that children at the present time consume enormously more of these salivary depressants than they did a hundred and fifty years ago, when teeth were comparatively healthy.

From a dental point of view alone, neither tea nor meat could exert any harmful action by themselves, of course; but it is when they are taken in conjunction with soft, adhesive, insipid carbo-hydrates, as they usually are, that the harm results; even the feeble natural protection evoked by the latter is still further decreased.

Compare the dietetic conditions in England, say, one hundred or two hundred years ago, when caries was quite a spasmodic disease, with those obtaining to-day. Then there were no elaborate roller mills for the ultra-refinement of flour, bread was very largely "home-made" from flour ground between stone rollers; then there was no wholesale importation of meat from abroad, there were no enormous biscuit and chocolate factories pouring out hundreds of tons of tooth-destroying material every year, tea and sugar were both articles of luxury and very dear.

The practically universal drink at all meals was wine, French and Spanish being drunk by the upper classes, and English wine—i.e., cider—being the drink of the middle and lower classes; and these, of course, were active salivary stimulants. Pepys wrote in 1660: "I did send for a cup of

*The following sentence in a child's story-book unconsciously reflects a real physiological principle: "It was not so much the cake as the cherries in the cake that Norah liked."

tee (a China drink), of which I had never drank before." England now receives from India and Ceylon alone 300,000,000 pounds per annum, and the consumption per head is between 5 and 6 pounds per annum.

The manufacture and consumption of confectionery has developed enormously of recent years, and in this easily fermentable sugars are largely used, not the least of which is honey. The production of honey for this purpose is conservatively estimated at 300,000 tons per annum. Again, honey by itself would not be anything like so harmful as it is when incorporated with finely pulverized and cooked starches.

The total consumption of sugar per head for the United Kingdom is estimated at 77.83 pounds per annum, and, seeing that nearly the whole of this probably is uncombined with an acid, it all has a potential in initiating caries.

The method of making bread nowadays by chemical aeration conduces also to caries. In the old-fashioned method, yeast more or less pure was used in the "leavening" process, and also a not inconsiderable amount of salt (as is the custom in Scotland at the present time), the result being that the bread had a distinctive flavor of salt and a just appreciable acidity, due to the presence of acetic and lactic acids. Now, however, since "aeration" is produced by the action of acids on carbonate of soda, and since excess of the latter is always added to prevent sour taste, the resulting reaction is always alkaline, and therefore the bread is a salivary depressant.

In order to have some definite facts as to the average food of a modern civilized community, I collected the detailed dietaries of 1,500 public school children on one day. The age of the children varied from ten to fourteen years. The district was one in which there is practically no poverty, in which, too, the living is known to be good amongst all classes, yet it is one, also, in which caries is known to be present in over 90 per cent. of the children.

The following table gives in concise form some of the results of the inquiry; they are self-explanatory:

DIETARIES OF FIFTEEN HUNDRED SCHOOL-CHILDREN.

BREAKFAST.

Solids.

Bread and butter	64.4
Porridge	53.8
Eggs	47.8
Toast	37.8
Bacon (or meat)	33.4
Jam	10.6
Cake or biscuit	5.0
Fruit	1.6
Potatoes	1.0

Tea	31.6
Pudding	0.5
<i>Fluids.</i>	
Tea	59.10
Milk	15.40
Cocoa	11.60
Water	7.00
Coffee	4.00
Lemonade	0.26

DINNER.

Solids.

Meat	75.0
Pudding or pie	61.6
Vegetables	55.6
Bread and butter	40.1
Biscuit or cake	19.6
Jam	10.0
Eggs	4.8
Fruit	4.2

Fluids.

Water	28.6
Milk	14.6
Coffee	1.4
Cocoa	5.6
Soup	7.6
Lemonade	7.6

TEA.

Solids.

Scones, cakes or biscuits	76.8
Bread and butter	68.3
Meat	49.2
Vegetables	34.2
Pudding or pie	26.0
Jam	19.7
Eggs	6.4
Fruit	4.5
Salad	3.1
Toast	2.8
Cheese	2.6

Fluids.

Tea	65.8
Milk	11.1
Water	9.1
Cocoa	6.5

Soup	3.0
Lemonade	1.5
Coffee	1.3

SUPPER.

Solids.

Bread and butter	15.9
Cake	14.8
Biscuit	13.0
Chocolate	10.3
Scone	3.4
Meat	1.2
Fish and potatoes	1.2
Salad	0.7
Porridge	0.6
Fruit	0.0

Fluids.

Milk	12.6
Water	12.4
Tea	7.0
Coffee	4.1
Lemonade	3.6

In cases where no supper was taken, the last thing eaten at tea-time is recorded in the following table:

Cake	16.80	per cent.
Bread and butter	13.30	"
Pudding	5.40	"
Bread and jam	4.60	"
Biscuits	2.20	"
Meat and potatoes	1.20	"
Fruit	0.80	"
Tea	0.30	"
Soup	0.06	"

It cannot be suggested that these tables do not show an extremely liberal dietary; it is possible that in some cases a little more than the truth was told, but for the vast majority of the cases I am satisfied that these tables represent faithfully the dietary of the district. Such diets might be criticized from other points of view than the solely dental, especially bearing in mind that it is the food of children which is being considered.

Note, for instance, the enormous proportions of meat and tea which are consumed, loading up the systems of the children with alkaloids and extractive stimulants.

From a dental point of view, the diet may be very briefly summed up as being *salivary depressant and of high acid potential*.

A most remarkable similarity will be noted between the order in which the articles of diet are arranged in these tables and the order previously noted of their capability of acid production. They are also practically in inverse order to their power as salivary stimulants.

If nothing were known about the teeth of these children, it could be said with absolute certainty from these data that they would be found to be in an extremely bad condition. This, as has already been indicated, is so; moreover, speaking from a considerable experience in examining the teeth of the children of this district, the incidence of caries in each mouth is appallingly high, so much so as to constitute a disgrace to any well-to-do civilized community.

One of the points of most importance is the food last eaten during the day, and therefore, in the majority of cases, debris of which would remain to be fermented during the night.

It is seen that bread and butter, cake, biscuit and chocolate are the articles which are last consumed in the great majority of cases—articles which adhere strongly to the teeth, form the greatest amount of acid, and produce the least flow of saliva.

It is, again, one of the most significant facts brought out by this inquiry, that *not one child in fifteen hundred had fruit of any kind last thing at night, and that only 0.8 per cent. had fruit as the last thing at tea-time.*

In view of the fact that fruit has been shown to be one of the best detergents and excitants of the solvent and neutralizing powers of saliva, its practically complete absence here cannot be regarded as other than one of the greatest causes of the prevalence of caries.

Although, naturally, diets vary in different localities and countries, and vary also amongst different classes in the same districts, yet it probably would not be wrong to take the foregoing tables as representing an average dietary of modern civilization, erring, probably, on the side of liberality; but, still, the proportions of substances to each other for various meals (excepting, perhaps, meat and tea) would, I think, practically hold good. We may therefore conclude that the dietary of civilized communities at the present time errs seriously in the direction of being too soft, of having too high an acid potential, of being not sufficiently stimulating to the salivary glands and not sufficiently detergent.

In considering how such a dietary may be corrected, social and economic conditions have to be borne in mind; it is neither possible nor desirable that any sudden or drastic change should be made. Conditions must be accepted as they are found, and an attempt made to improve them.

It is impossible, for instance, under modern conditions, to ban absolutely all soft and fermentable carbohydrates. Improvement in this direction may come in time, but it will be essentially a slow and gradual process depending upon the rapidity with which people are educated to demand such an alteration.

Sufficient has, however, been said to show how the majority of food

substances of high acid potential may be rendered practically innocuous.

It has been shown that by the combination of strong salivary stimulants with such substances, either in a mixture or, much better, in sequence, the acid production may be reduced to a minimum or entirely negatived.

What is therefore to be advocated is that *all meals should contain a fair proportion of salivary excitants, and, more important still, should both commence and end with some article of diet having an acid reaction.*

This does not of necessity imply a "vegetarian" diet; in fact, many "vegetarian" meals are distinctly conducive to caries on account of their soft, pappy and adhesive nature.

The only meal in which the principle of salivary stimulation is usually correctly observed at the present time is a dinner commencing with *hors d'œuvre*, and terminating with fruit as dessert.

A similar arrangement, however, can be quite easily arranged for all other meals. When garden fruit and vegetables, particularly the "salad" variety, are in season, this should present no difficulty whatever, and the length of "season" is constantly being lengthened by the importation of fruit and vegetables from warmer climates; in fact, at all seasons of the year now, and practically everywhere, some fresh fruit at least is available.

For *breakfast*, porridge with salt may form the initial stimulant. This may be followed by anything else customary to the individual, pineapple, pears, plums, etc.—preferably raw, but they may be such as fish, bacon, bread and butter, and marmalade or jam; the latter should not be merely syrup flavored with fruit-juice, as too many of the factory-made articles are. The meal should be concluded with some form of fresh fruit—oranges, apple, banana, "stewed."

For *luncheon* or the midday meal, the initial stimulus may be some modified form of *hors d'œuvre*, such as a radish or a small portion of some acid fruit.

With meat some form of sauce may be taken; such things, being nearly all acid, serve as excellent salivary stimulants. (There is no objection to children taking *small* quantities of these sauces. I have never seen any ill results follow.) The meal may be concluded with stewed fruit, fruit pudding or pie, provided that in the later the fruit predominates, and not the starchy element, and that it is not made too sweet. "Salad" should, of course, be taken wherever possible, but its good effect may be entirely neutralized by its being followed, as it too often is, by a biscuit and coffee or some form of confectionery and tea.

Tea, especially when it is the last meal of the day, is the one most responsible for the production of caries. It almost invariably ends with cake and a second or third cup of tea, containing, probably, in the vast majority of cases, a high percentage of tannin. Thus absolutely ideal conditions are brought about for acid fermentation to take place in the mouth. There are a number of salivary stimulants which may be included

in this meal, such as tomato, cucumber, cress, sardines, shrimps, or fruit sandwiches. Fruit salad or any fruit in season should terminate the meal.

Last thing at night, children (and adults, too,) should always eat a small portion of some detergent and acid fruit, such as orange, apple, pear or pineapple.

Taken in such a manner, the total amount of fruit and vegetable need not be large, and in no case should such a dietary be commenced suddenly; it should, especially in those who have been accustomed to the inclusion of fruit and salad in their dietary, be worked up to gradually, commencing with one meal a day; then, after a week or so, two meals may be terminated with "acids," and finally the principle may be extended to all meals.

Should any intestinal irritation be set up the inclusion of boiled milk in the dietary will correct it; this I have found to be but very occasionally necessary, and only in the initial stages.

The much-dreaded bugbear "diarrhoea" is much more likely to be caused by eating fruit in an unclean condition than to be due to the mechanical or chemical action of the fruit on the bowel. All fruit, therefore, especially that of unknown source, should be well washed or have the skin removed before being eaten. The only effects of fruit taken regularly and in such moderate quantities is to insure a full and regular action of the bowels.

In special cases the reaction and amount of saliva should be estimated during the change, to see that the desired result is being produced; and when the maximum amount and alkalinity per minute have been reached, any increase in the acidity of the dietary should be stopped, and it may even be decreased a little.

The difficulty, in many cases, of adopting such a dietary may be on account of expense and inaccessibility of fresh fruit and vegetables. Tinned fruits are, however, now everywhere available at moderate cost; and these, especially pears, pineapple and apricots, may be substituted, not with advantage, but as being better than nothing.

In respect to fluids, children particularly should never drink tea, and the less it is consumed by adults the better, even from a dental point of view alone.

Milk, water, home-made lemonade and weak lime-juice are the beverages suited for children. Lemonade should not be too strong, and should contain a sufficiency, but not an excess, of sugar; that is to say, the acid should be quite appreciable to the child, and should be sufficient to precipitate the mucin and prevent the sugar from being fixed to the teeth.

If similar beverages were more consumed by adults, it would, I think, largely lessen the craving for tea and sweetmeats so prevalent at the present time.

As regards *sweets*, all are good in that they are salivary stimulants, and

all are bad in that they are readily fermentable; and as a general rule it may be said that the ill effects quite outweigh the good effects. They all (practically) leave sugar behind in the mouth to be transformed into lactic acid—chocolates and caramels most, and hard-boiled sweets like toffee least. The old-fashioned "acid drops" are possibly the least harmful. Children should, however, be encouraged to spend their pocket money on fruit rather than on sweets, and on biscuits least of all. Almost all children prefer fruit to sweets if they are allowed to exercise their choice. Of the 1,500 children whose dietaries I examined, 90.35 per cent. said they preferred fruit to sweets, and only 9.65 per cent. preferred sweets; yet the amount of sweets consumed by these children was enormous, and the amount of fruit a minimum. I think there is no doubt that a growing child can obtain all the sugar it needs for its muscles, fat and heat development, from consumption of it in a natural form, i.e., as found in fruit and some vegetables.

Bunge* has called attention to the danger of the great increase in the consumption of pure sugar in recent times, pointing out that it must diminish the amount of vegetable foods in the diet, thus leading to a loss in the supply of calcium, iron, fluorine, and other mineral ingredients to the blood. Hutchinson is also of the opinion that it may be connected with the increased commonness of diabetes.

It is commonly affirmed in text books that one of the articles which have been quoted as salivary stimulants—i.e., cider—destroys the teeth. With this the author cannot agree, having had considerable experience of the teeth of the inhabitants of one of our cider countries, and also of those of other counties and countries. The difference between dentures from this county and those from an adjoining county where mining was carried on, and fruit and cider were not available, was always most marked and obvious; and whenever the mining community makes an incursion into the cider country, their avidity for fruit is, to say the least, very pronounced.

It has been stated that the consumption of large quantities of grapes in those patients undergoing a "grape cure" has bad effects upon the teeth. I have no knowledge of this; but if so, it is probably attributable either to the grapes being too ripe, and hence acting, as has been shown, as very feeble salivary stimulants, or, if not too ripe, to the constant presence of too much acid in the mouth proving more than the saliva can neutralize; possibly the glands get overworked and do not have time to recuperate.

Black* some years ago came to the conclusion, after "a hasty examination" of dried skulls, that there was a connection between immunity to caries and sour-fruit eating, but apparently abandoned or did not follow up his conclusion; and Leon William† states that the Sicilians, who are large consumers of lemons, are particularly free from caries.

*Quoted by R. Hutchinson, "Food and Dietics," p. 280.

*"American System of Dentistry," p. 730.

†Quoted by Goodby, "Mycrology of the Mouth," p. 139.

NOTE ON THE SOURED MILK TREATMENT.

However beneficial this treatment may be for other portions of the alimentary tract, there can be no doubt that as a general rule it must be harmful to important organs of the first part of the tract—i.e., the teeth. Not because the milk is sour—in that respect it can be only beneficial—but because a large number of lactic acid organisms are introduced into the mouth, and these of a variety specially selected on account of their ability to form a maximum amount of acid. The following tests with soured milk give examples of what may happen:

Two persons, A and B, drank ordinary milk, and then each insalivated 2 grammes of bread; this was incubated for forty-eight hours, and the acid formation estimated—

A=2.83 units.

B=2.8 units.

(N NaOH).

Milk which had been infected with lactic acid bacilli (fermen-lactyl) for eighteen hours at body temperature was then drunk, and 2 grammes of bread again insalivated by each. In forty-eight hours the acid production was:

A=4.6 units.

B=4.7 units.

This considerable increase in both cases could only have been due to a considerable increase in the initial number of organisms present in the mixture and there is no reason to doubt that the figures represent the proportionate tendency to tooth destruction, in both cases.

Both of the above individuals were susceptible to caries; a similar test was made with an immune person:

After ordinary milk the bread yielded in forty-eight hours 1.4 acid units.

After soured milk the bread yielded in forty-eight hours 1.2 acid units.

The difference between this and the two former tests is very marked; not only is the acid protection from the control only one-half of what it was from the susceptible, but also the amount of acid produced from the bread masticated after soured milk was less than the control. The results are to be explained entirely, I think, by the increased neutralization by the saliva of the immune. It therefore seems clear that in the average individual—i.e., one susceptible to caries—soured milk may prove to be very harmful to the teeth. In order to combat this the teeth should be cleaned, and a salivary stimulant used immediately after taking the milk (or powder). To expect to remove the introduced organisms by rinsing the mouth out with water for half a minute or so would be futile. I would suggest the eating of a piece of orange as one of the simplest and best prophylactic measures which could possibly be adopted.

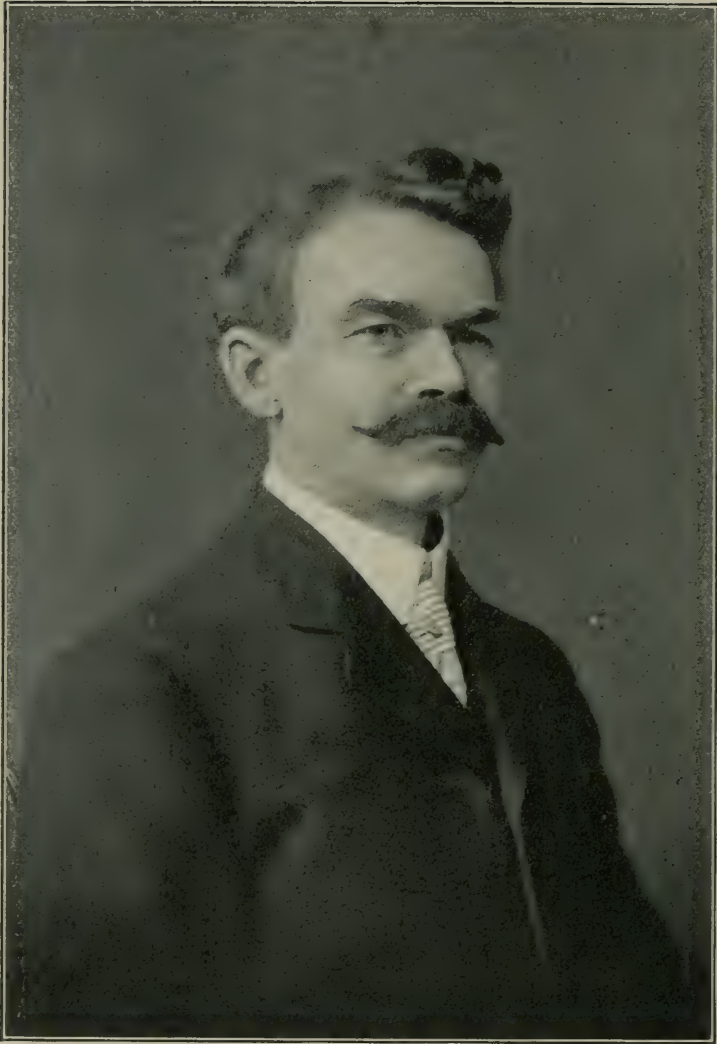
Goepp's Dental State Board Questions and Answers.—Dental State Board Questions and Answers, by R. Max Goepp, M.D., Author of Medical State Board Questions and Answers. Philadelphia and London: W. B. Saunders Company, 1912. Cloth, \$2.75 net.

This is a work of four hundred pages containing the questions and their answers which have been set by the State Board Examiners in the United States. The questions and answers have been so arranged and indexed as to make them easily found and to completely cover the whole range of dentistry without duplication of questions, and where questions have not been asked by the examiners others have been incorporated. If the questions had been published without the answers the book would have been quite as useful as it is, because many of the answers are very bad indeed.

In Dental Anatomy the lower first bicuspid is described as being larger than the second. In Operative Dentistry a proximal cavity in a bicuspid is recommended to be filled with sponge gold from the buccal surface. Such answers detract from the value of the book. It is chiefly valuable as a book of reference.

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W. R. GREENE, D.D.S., L.D.S.,
President Ontario Dental Society, 1912.

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THE BURLINGTON CONVENTION

of the Canadian Dental Association, Ontario Dental Society, and Dominion Dental Council, held at Burlington, Ont., on June 3rd, 4th, 5th and 6th, 1912.

(Continued from July issue, 1912.)

DENTAL OFFICE ASSISTANTS.

A. E. WEBSTER, M.D., D.D.S., L.D.S., TORONTO, ONT.

DR. WEBSTER: Mr. President and Gentlemen: The heading of my paper is, "Dentists' office assistants." I found some difficulty in getting a title for this paper that would mean exactly what I intended it to mean. I do not want it to mean the assistant to a dentist who may be also a licentiate as well as a helper. I want it distinctly understood that I am not discussing that type of man who comes into an office and acts as a laboratory man and perhaps assists at the chair and perhaps does a little operating once in awhile, or a nurse who does similar work. I am confining my remarks to that which is inside of the dental law of most of the provinces of Canada.

Inasmuch as it is illegal in most Provinces in Canada for anyone to perform dental operations who has not a license, I do not propose to discuss the dentist's assistant. It is the dentist's office assistant I propose to discuss.

The greater the skill required of the dentist the more expensive become his services. Before a young man can be prepared to practise his profession his education and bringing-up will have cost in the neighborhood of \$12,000.00. Interest on this investment, rent, supplies, office expenses and living make the young graduate's time worth at least two dollars an hour with a very long and completely occupied day. The time of most dentists of experience is worth three to eight times this amount.

It is only for very special skill that the public should be asked to pay

from ten to fifteen dollars an hour. No dentist is justified in charging ten dollars an hour for his time if he spends it sterilizing instruments, making appointments, answering the telephone or acting as housekeeper, because these services can be just as efficiently done by someone whose education has cost less. The dental office assistant is an economic necessity in our highly specialized calling. Besides this no operator can go on comfortably malleting a gold filling while his telephone rings or people are impatiently waiting to see him. Neither can he properly leave his patient to answer such calls while the patient is in discomfort, if not actual pain. Someone besides the dentist should be within easy reach at all times.

The assistant should be a young girl when she begins. It is difficult for anyone over thirty years of age to learn the details of dental office routine. There are a few dentists who employ men as office assistants, and others little colored boys in livery. Neither of these in my judgment fulfill the requirements. The dental office assistant, like the dentist himself, must be a specialist in many arts. She must above all be a good house-keeper—this means so much. She must have the knowledge of a nurse and the capability of execution of the house-keeper. She should have refined tastes, clean habits and good address. She should have a certain innate capacity for knowing or divining the wishes of others. This will make her efficient at the chair, of service to patients and capable in making appointments and answering the telephone. She should be capable of writing legibly, keeping dental books, and perhaps running a typewriter. It would be well if she had some mechanical turn of mind. No greater misfill could be found in a dental office than a would-be society girl. If a dental office assistant is to be of any service it must be her business, not her pastime. I often visit dental offices where I am met by a beautifully attired young lady who has just arisen from her fancy work. I feel like a disturber of the peace. Such a girl may belong to the best family in town, and be a star at a pink tea, but she has no place in a dental office. She may be worth her weekly wage to give the place an air of respectability, but no dental office should need such bolsterings.

The dress of the assistant should be plain and in keeping with the duties performed. Some wear a nurse's uniform and others the gown of a garden-party. At certain duties a large apron should be worn, while at others it should be discarded. I am not convinced that the nurse's uniform is desirable, though it looks well at some duties, but is wholly out of place at others.

HOW SHOULD DENTAL OFFICE ASSISTANTS BE TRAINED?

There was a time when every occupation was learned by apprenticeship. To-day the tendency is to teach everything in schools, from theology to motherhood. Dental office assistants, as in many other callings, could be taught a great deal in a school which would reduce the office training

period. The Ohio Dental College has conducted such a course for several years. Another school has recently been established in Boston. There is no reason why one should not do well in Canada.

The duties of an assistant cannot be specifically defined. The assistant who desires to have her duties defined from day to day is a nuisance. She should feel full of responsibility for the house-keeping and in a measure the furnishings of the office. The equipment should be under her charge. If an appliance or an instrument is lost or broken it should be her duty to see to its replacement. Laundry and sterilization should be in her hands. She should order and account for all supplies.

A well trained assistant should stand between the dentist and the outer world. Every person entering the office should be at once seen and their business found out. Only in rare cases should it be necessary for the dentist to see anyone in the waiting room. I make it a rule to see those who give their names Dr. So-and-so, but not to see others unless they state their business to my assistant, and only then when it is of interest. The telephone is quite as much a waste of time as the door unless the assistant is very wise. All appointments should be made by the assistant. It is generally an economy of time to have a time in each half day for consultations, examinations and minor treatments.

When an appointment is made it should be the assistant's duty to get the name, address and satisfactory references or a deposit. When the examination is made the assistant makes the records on the chart. In fact she should make and keep all records and do all the book-keeping, issuing statements, collecting, banking, and payment of bills. The dentist should make the charges. In some offices the professional and some private correspondence is attended to by the assistant.

A well trained assistant should have all used instruments away from the bracket and sterilizing, the patient dismissed with an appointment, and the next patient ready in the chair while the operator washes his hands and records the fee. A convenient dressing-room saves much time. At the chair the assistant is of great help in preparing the patient for operation and adjusting the dam, preparing napkins and the necessary instruments. All filling materials, medicines, and instruments should be prepared for use. Gold foil should be annealed, carried to the cavity and malleted by the assistant, and as soon as filling is inserted the bracket cleared and finishing instruments prepared. Amalgams and cements should be mixed and given to the operator in such forms and quantities as desired. Root-filling materials, dressings and sealings should be placed as directed by the operator.

In the laboratory an assistant should be able to repair a denture; put through a case except set up the teeth; invest, mix plaster for impressions; polish a crown, a bridge, a denture; make an inlay from a wax model; bake porcelain if not build it up. In time any skilful girl can learn to do

laboratory work quite as well as most men; it is only a question of time in a busy office. Usually her time is more profitably employed in the manner hereinbefore indicated.

The best assistant is the one who wants to assist. Without this one thing all other qualifications are useless.

DISCUSSION.

DR. R. G. McLAUGHLIN: Mr. Chairman and Gentlemen: I rather think Dr. Webster has left very little to be said on the subject of office assistants. His experience and the necessities of his own case have given him a very comprehensive idea, and that perhaps is the best groundwork for him to work on. I did not have the opportunity of reading Dr. Webster's paper before writing my discussion. Dr. Webster, like so many other men who have to write papers, was very busy and had to postpone the writing of his paper till the last moment. However, he was good enough to send me the headings that he proposed to follow in writing his paper, and I see he has adhered very closely to them. However, I could not anticipate just what Dr. Webster was going to say on these particular lines, and if we have said a good deal that is alike you will know it was not with malice aforethought. As I listened to the paper this afternoon I found there were many more things that we agreed on than we differed upon.

In order to discuss this subject intelligently it will be necessary to define the status of the assistant attached to a dental office. Having determined her rank or place in the office, and what duties she is allowed or not allowed to perform, it will then be a simpler matter to indicate her necessary qualifications and training. So in discussing the qualifications and training of the dental assistant I understand what is meant is the regular office assistant.

A properly trained, intelligent, tidy, anxious-to-please assistant is perhaps the most profitable asset under the control of the modern dentist, for the really efficient assistant should be able to relieve the dentist of almost all official duties outside of the direct work on the patient.

Her native qualifications might be summed up as follows: A pleasing manner, capable of managing people (including the dentist), a keen appreciation of cleanliness, and last but not least, she must be strictly honest. Her training should give her a good working knowledge of the equipment and details of an office practice. Out of the many, I would like here to specify at least three of the more important duties expected of the assistant:

1st. To keep the office stock in all its branches constantly replenished. This is of prime importance to the busy practitioner, as frequently much valuable time may be lost because some particular instrument or material is not available or even in stock when needed.

2nd. The dental assistant should possess a good knowledge of dental

bookkeeping, accounts and correspondence. This part of the office work not only consumes a great deal of time, but it requires care and exactness, as mistakes in bookkeeping and making out accounts are frequently the cause of much friction and discontent.

3rd. The cleansing and sterilizing of instruments. The assistant should not only know how to sterilize, but should know the reason why so much importance is attached to this part of her duties. With this understanding she will sterilize more intelligently and no doubt more thoroughly.

The assistant should meet the patient in the reception room and at the proper hour have her seated in the dental chair with the protection linen in place. The chart should be open for inspection and when the operation for that hour is indicated the assistant should know what instruments and material are needed throughout the consecutive stages of that particular operation. This much the assistant should be able to accomplish without many spoken directions from the dentist.

This faculty of silently anticipating the dentist's wants during an operation, I hold, is an important part of the training of an assistant. The unusually nervous patient is frequently soothed and her confidence gained by the quiet and watchful attention on the part of the assistant. Also much valuable time is consumed and the operation goes more smoothly.

Again, the assistant should possess a good working knowledge of human nature. As she meets the impatient patients in the reception room or talks to them over the telephone, she should be able so to gain their confidence as to find out their wants, make their appointments, etc., without having to disturb the dentist in his work. This often proves a real test for most assistants. There always are a few patients who will insist on "speaking to the doctor." Such people have thoughtlessly put a low estimate on your time, and cannot understand why you should not at any time be ready to listen to their story over the phone.

One cannot help but conclude that such patients have been badly spoiled by an over-indulgent dentist somewhere.

Just how much the assistant can be depended upon in the way of preparing filling material, such as mixing amalgam, silicates, ordinary cements, carving cusps, baking porcelain, finishing inlays, etc., is perhaps a debatable point. In my own practice there are a few of these I have persistently worked with my own hands. I refer to the mixing of the silicates, the carving of cusps, and the mixing of cement for inlay work or crowns or bridges. In these three cases the dentist knows exactly what he wants, and how, and will find it very difficult to tell his assistant just what consistency to mix the cement for a particular case, or how to carve that individual cusp. And as for the silicates, you all know how cranky they are and you had better handle them yourself. Again, should the office assistant be expected to do general laboratory work? My answer is that in an office where the dentist is constantly at the chair, it is out of the question. The

reasons for this are obvious. In the first place, time will not permit. The dental assistant cannot render proper service to the operator and his patients and at the same time be occupied with the rougher work of the laboratory. If an assistant is to render you the maximum service she must as far as possible be not more than a few feet distant from the chair.

DR. DAVY: There was one point mentioned by both Dr. Webster and Dr. McLaughlin, and that was about having appointments made by the assistant. That is a question which is quite important, to my mind. These assistants will have to make careful examinations, or know largely what ought to be done for the patient, in order to give the proper time for an appointment. Oftentimes it is difficult enough for a dentist who has an accurate knowledge of the requirements of the cases, after having seen them, to give sufficient time for appointments, and I believe if the assistants make the appointments that more time will be lost than by the dentist himself seeing the patient. Another point was mentioned which might work out all right in a city practice. That is having certain hours for consultation. In a country practice that is impossible. We have patients who come in from the country maybe first thing in the morning and they are desirous of getting away before noon. They may come in just before dinner, or just after dinner, and we cannot expect them to make special trips in at special times to see us for consultation. While I agree to a large extent with the paper, in these two matters I cannot just see eye to eye.

DR. F. D. PRICE: It has been most refreshing to hear the papers read by Drs. Webster and McLaughlin, and I am sure the discussion will wax warm, because it is most important with most of us. One thing I thought of was this, if the dentist is busy, how busy must the assistant be? I am sure it will be of some assistance to some of us in the training of our dental assistants, to get the literature printed of this meeting. I often wish there was a course of correspondence prepared for the dental assistants. One often comes across an article in a journal that will be of some help to the assistant. I would like to see a course of correspondence, if not a course in a college, for the training of the dental assistants in dental offices. I am not very much afraid of the dental assistant performing operations that are contrary to law. I think the dental assistants will have so many duties to perform that the dentist himself will find he has most of that left to himself. I would not in fact be afraid if our law would permit of the dental assistant performing some minor operations such as putting in dressings. That would be of great assistance to the dentist. The question has been raised as to the assistant making appointments and so saving the time of the operator. I have been accustomed to say to some of the patients who insist on having me speak to them in the waiting room or over the telephone that my assistant looks after me and my office; and even plead ignorance as to what time the appointment is. One can do that quite truthfully, not knowing the time that is marked in the book, and you

can say to that troublesome patient that you do not know, that your assistant makes the appointments. Let the assistant answer the telephone or speak to the patient who wants to do a lot of gossiping, thus taking up unnecessary time.

DR. MAGEE: Dr. Webster spoke of making appointments over the telephone, or perhaps it was Dr. McLaughlin. Conditions differ in different localities. The making of appointments must be considered in a different aspect in a rural practice than in a densely populated city. A specialist is obliged to have an assistant, and when Dr. Webster speaks of assistants having all these duties he certainly refers to one who is an ideal. I do not know of any dentist who has one with all the qualifications that Dr. Webster enumerated, but if there is one that dentist has a jewel. I have had a number of assistants that I tried to train to the requirements that I feel are necessary for my practice, and if they were at all comely they disappeared in the ordinary course of human life—they got married when they were just about as useful to me as they could possibly be; and therefore Dr. Webster left out one very desirable qualification, that they should be so homely that no man would ever ask them to marry. I quite agree with the former speaker who doubted the advisability of having the assistant take charge of the preparation of the different materials. If we are using amalgam, which is weighed in a balance scale, the assistant can properly mix it, but if it is one which must be mixed in proper proportions, according to the judgment of the operator, the assistant cannot properly measure it out, in my estimation. There is one class of material which I think the dentist should mix himself, and that is cement. I have tried to train operators to mix cement as I think it should be mixed, and I have failed. I may show my assistant how I have been mixing it, and he may make fifty mixtures of that cement and he will not get one of them half as good. Now, when you cannot get a dental operator to mix it properly, I do not think you could get any woman to do it. I have something of the same trouble with making appointments with those uneasy patients, and I tell them to get the number and I will call them. If that does not work they can go. I do not want to be bothered with people of that kind. If they want me badly enough they will wait till I call them.

DR. GARVIN: When I spoke on the previous paper I did so on the call of the chair, but now I speak on my own initiative. This is one of the papers at this convention that I am particularly interested in. I thoroughly enjoyed the splendid way in which the essay was handled. I tried to picture to myself, although it was hard, an office assistant, while those directions were being given, and I tried to appreciate just about their manner when these numerous qualifications were outlined—sterilizing, answering the telephone, a good house-keeper, refined habits, and above all initiative and silently anticipating a man's wants, making of appointments, a good writer, stenographer, mechanical ability, one who could

stand between the dentist and the public; that is, the impression that an outsider gets when he comes to your office, outside of the general surroundings. All these things would justify the obtaining of the most capable girl that is open to engagement in business life. In regard to making out accounts, I am reminded of a discussion between two of our leading business men of the West as to the reason of the moderate success of a certain man engaged in business in Montreal. This discussion took place among the leaders in business life in England, and the question came up why these men with the mental calibre that they were known to have were not more successful, and one of them said he could explain it, and he said, "Have you ever noticed that the cheques that are sent to you from that firm are always made out by the man who signs them?" Now I thought that brought out a splendid point. I think too many of us make out our own cheques. That idea is one I would carry into every branch of our work. In regard to assisting at the chair, I think that might be amplified. The operator is busy at the chair all the time, and I would include many more duties than mentioned along that line, such as wrapping the cotton on the numerous broaches ready for treatment, the moving of broaches from the sterilizing solution to the holder, the placing of amalgam in the holder, getting the holder ready to pass to you immediately, and from there to the tooth, the keeping of a cavity dry in the front row, and many other duties which would keep one busy most of the time assisting at the chair. The question of looking after supplies is important, but not of the same importance as the other points mentioned. I thought it would be interesting, too, if we had one of our assistants come here and write a paper on their impressions of the dental profession. I think perhaps we could get more real benefit from that than we could from the other side of the situation. Not very long ago I endeavored to find this capable girl that has been outlined here to-day, and met with many amusing incidents. I offered one young stenographer a good deal more than she was getting, and I offered her still more at the end of six months, feeling that if she had the makings of a success in her present work she would make an equal success in my office. She thought it over and turned it down. Now, the reason, I believe, was that the opportunities for those girls along those lines were not great enough. No matter what salary I paid her, whether it was satisfactory or not, she refused that position because if anything happened me, or if for any reason she lost the position that I had offered her there was no opening for her beyond the dental profession, and that she would have to go back to her old work. Even with the inducement of as much again she knew the opportunity at present in the dental profession was not such as would justify her in giving up the work she was at. What does all this mean? It means, gentlemen, that the time will come when the busy practitioner will have not only one assistant, but at least two, and Dr. Harrison, when I asked him, said three. The time has come when we

will have at least more than one assistant, and one of those assistants will be kept busy most of the time at the chair, and one will be, I think, a stenographer. With the duties as outlined only the most capable girls that we find filling positions in business life can possibly live up to the demands, and we have got to pay a salary that is equal to what they can earn in other vocations. That is not the salary the average practitioner is paying to-day. A girl to-day can earn more in some restaurant where the qualifications are not to be compared to those that have been outlined by the essayist, and the other speakers, this afternoon, and I think the time has come when the salaries paid to the assistants will have to be doubled or trebled in order to secure the kind of assistant which every dentist trying to reach the top must have.

DR. DAY: There was one point in the essay that was not brought out prominently in the discussion, and that was the bookkeeping of the office. Now, a dental office assistant to do bookkeeping must be a bookkeeper the same as if she were in any other business, and a person who understands bookkeeping does not have to sterilize instruments. I am doubtful if you could get a person who would meet all these requirements, and even if you do you cannot get one to do the bookkeeping. The only proper way to do the bookkeeping in a dental office properly is to have it done by a bookkeeper, and you cannot expect a girl to do that.

DR. WEBSTER (closing discussion): Mr. President and Gentlemen: As to mixing cements, we expect a young man in the study of dentistry to learn how to mix cements in probably two years, and many dental office assistants are five, six, ten or fifteen years in a dental office, and they should not be there that long if they cannot learn how to mix cement. They should have been married long before. Now, about carving cusps. I think perhaps it is quite true, as one speaker has said, that the operator himself must do that. Of course he must in the great majority of cases. He must himself set up the teeth in a bridge or set up the teeth in an artificial denture. He must himself rough the cusps in the inlay. There is no reason, though, why his assistant cannot polish the inlay after he has roughed it up. Then the setting of inlays. Just take it this way. The cavity has been prepared so far as it is necessary to prepare it to make the wax model. The inlay is made. It is fitted into the cavity, and it is trimmed ready for polishing. While the assistant polishes that filling the operator may remove the remaining part of the decay and keep the cavity dry; in fact get it dry and keep it dry, whilst his assistant comes back to the chair with the filling ready polished and is prepared to mix the cement in the consistency according to one, two or three. If you desire to have the cement mixed one, say so; two, say so; three, say so. That has a definite meaning as to consistency. The cement is brought to the chair and the assistant places it and works it into the inlay while you do the same in the cavity, never allowing the

cavity to get wet after having removed the decay. I do not see anything difficult about that.

Appointments: Dr. Davy spoke, and many others spoke, about the difficulty of making appointments. True, it is difficult. Dr. Davy said that as much time would be lost by the assistant making the appointment as if the dentist made it himself. Now, when the patient leaves the chair I say to the assistant, "Three or four days; half an hour." That is enough.

A DELEGATE: What about the first appointment?

DR. WEBSTER: That is different. The assistant says over the telephone, "What seems to be the trouble?" The answer is, "Well, I just want to have my teeth examined." Very good, she knows what to do. If a patient comes from out of town she says, "How long are you going to be in town? What is the best time for you to come? Have you anything that would occupy the doctor half an hour or an hour?" Now, a patient who is in the habit of having work done will have some knowledge of that and will be able to give some idea of the time required. The assistant many times can make out appointments quite properly, but in the great majority of cases he can only make it for a short time. Then the difficulty with reference to the country practice. I think we ought to have a paper upon that before the Canadian Dental Association. We had a paper on appointments in small towns and the management of a country practice at the Ontario Dental Society meeting, and it would be well if that could be brought before this association again. I will leave that with the association.

I do not agree that the assistant should ever do any kind of dental operation for a patient. Just the moment that assistant asks the patient to open his mouth just at that time there will be trouble. Let us stop right there. Do not allow your assistant to ask your patient to open his mouth. I would not permit it in my office.

Dr. Garvin suggested a paper by an assistant. It might not be a bad idea. I only now remember that one or two men spoke to me and said that their assistants wanted to hear my paper this evening at eight o'clock, and it might have been of some advantage for them to have heard this discussion.

PRESIDENT COWAN: I have listened to this discussion with a great deal of interest. It seems to me the all-important point in this is getting the discussion in the hands of our assistants. If they read it it may help us.

It was moved by DR. THORNTON and seconded by DR. RUSSELL, that the meeting now adjourn until the evening.

The President put the motion, which on a vote being taken was declared lost.

The PRESIDENT called on Dr. C. A. Murray to give his paper on "Business Possibilities for the Dentist."

DR. MURRAY: Mr. President and Gentlemen: The subject which I

desire to call your attention to for a few moments this afternoon is a very broad one, and I have simply touched upon the different phases of it. If I went into all the particulars, as you all know, it would be too long to read.

BUSINESS POSSIBILITIES FOR A DENTIST.

C. A. MURRAY, MONCTON, N.B.

The purpose of all human endeavor is to meet and satisfy the needs and wants of men and women. These wants may be physical or moral or esthetic; they are set deep in human nature, and they call for satisfaction. To give this satisfaction is, therefore, the sole function of a profession; and the value of the service rendered by any profession is measured by the extent to which these human requirements are thereby met.

These needs of man's body bear an immediate relation to his power as a producer or a creative agent; and we may safely assert that this relation, so far from being casual or accidental, is such that the value of the means by which these wants are supplied is measured directly by the quantum of productive power that is by those agencies added to the body served.

This may seem somewhat fanciful in respect to moral or esthetic matters. We are not accustomed to measure morality or the value of the fine arts by the increased efficiency which they give or might give to humanity. Such a notion, I admit, may appear to bear rather the stamp of ingenuity than of truth; but we will all admit that they have *some* such relation; that there is *some* such bearing; it is only the ultimate conclusion that their whole value is so measured, at which we balk.

But whatever may be our doubts as to the moral or esthetic, we have very little doubt that physical aspect of ministration to human wants has a direct relation to economic value. A person with one leg or with one arm is, to the extent of his physical impairment, reduced by so much in his power to do certain kinds of work. Man's purpose in life is to reduce the natural forces and the natural wealth about him to forms that can be utilized by him. He is given an intelligence behind physical agents; he has no more of the latter than are required by his existence in this particular world; and any derogation from them draws with it a corresponding reduction in the sum of his powers of work.

It follows that we are able to place a proper value on the art, or the trade, or the profession—whatever we may call it—which contributes in any way to the maintenance or improvement of these powers. The general question is: How far does the contribution of a profession add to the efficiency of man? When we determine this, we have determined the value of that profession; we have stated the return to which it is entitled. And it is on that added efficiency that we must base all claims to compensation. These considerations are governed by economic laws; and if a

profession is to increase its return from society that increase, too, must be determined by economic law.

Our enquiry must first be directed, therefore, to a consideration of the contribution which the dental profession makes to the efficiency of men and women. It would seem that the proposition that there is an immediate relation between the physical well-being of people and the condition of those bodily parts with which our service deals, needs only to be mentioned to be assented to, and it will be unnecessary, therefore, to elaborate to any extent whatever, this relation. The improved mastication, the resulting strengthening of the digestive organism, these and the many others are recognized by all. And beyond these there are the esthetic considerations. We influence by our personality, our own sense of power is heightened by the consciousness that our personality attracts, and no one can doubt the pronounced influence of the dental state of an individual in regard to his personality. This influence spreads itself into a myriad of relations which are, perhaps, weak or delicate, if taken alone; but which nevertheless, in the aggregate, are effective and formidable. It would not be possible here to do more than to suggest the existence of these relations; but the important fact for us is that there is such an influence, and so generated that it has a direct effect on the usefulness and power of men, and that it is immediately served by the dental function.

We have, therefore, for our profession the economic basis for compensation; what remains for us now to consider is whether that compensation is, in our time, economically just; if it is not we are to consider the legitimate means of bringing it up to its appropriate level.

In my opinion the return made to our profession by the public is not commensurate with the economic value of the service given. This is my judgment after years of experience and observation, and it is because I have such an opinion that I venture on this paper. But although I am going to assume throughout my remarks that such is the case, nevertheless, the suggestions I am to make will have, I hope, a sound basis in principle, so that whether my assumption be well founded or not, my observations may have some slight independent value of their own.

One noticeable cause of this condition is, I think, the fact that too many members are willing to sacrifice the integrity of their work to the deceptive prize of many engagements with correspondingly low charges. Such bargain-counter practices can and do end only in the degradation of the art; they fail to yield their employer even the doubtful benefit of an augmented income.

This is an unfortunate condition from the standpoint of the profession; but it is more so from that of the public. The inevitable result of such methods is loose and slipshod work, and impaired efficiency; and the penalty is paid by the community. The patrons receive less, but they give more; they undergo a succession of second-best operations and treat-

ments and suffer the attendant consequences; never the full physical and esthetic benefit enjoyed; tastes lowered and perverted, and an aggregate of charges paid out which, if fully realized by those who pay it, would soon put an end to bargaining in the matter of dentistry.

There is every reason, therefore, why the principles—if we can call them such—which have hitherto been applied to the business aspect of the profession, should be reconsidered. The profession requires it from a financial standpoint and from the standpoint of its work as an art; the public are entitled to it, and we will be but doing our duty by striking out in search of methods by which we will at once heighten our standing among the professional classes and render greater our contribution to the welfare of our fellows.

We have, then, the result that this work in which we are engaged is essential to society; its importance is being more thoroughly recognized each year; its science is steadily advancing, and there is going along with this a demand for higher skill and intellectual capacity in the members; we have, moreover, agreed that there is an economic justification for compensation; I am now going to give you a few suggestions as to a practical method by which to determine that compensation.

Let me premise these suggestions by remarking that there is no incompatibility between an art or a profession and financial considerations. The time was, perhaps, when this was not so considered, but we are no longer troubled by such artistic sensibilities. The world is recognizing high achievement in every art and profession as it never has before. Into whatever branch we may go, music, literature, sculpture, law, medicine, the same recognition is being made, that in all these there are the correlative features of the art itself and the financial recompense.

Let me now return to the suggestions I am to make to you. It is proper, I submit, to view the profession as an investment. Instead of placing our earnings into a business enterprise and creating our capital of financial interests, we have invested our money and our powers in a different capital, that of personal skill and scientific knowledge; this is our funded capital and it is that from which we must gather our profits. Let us see, then, if we have not come means of determining in a practical and understandable way, the value of this capital.

First, we spend three years in a school of dentistry—leaving out of consideration a preliminary course looking toward a degree in arts, which will soon become a necessary part of a dentist's equipment—at a cost running from \$1,500 to \$2,500; next we have to consider the earnings which might have been capitalized during that time had we followed some other occupation; this will, of course, vary greatly with individual cases, but we will be safe in estimating it at from \$1,200 to \$2,000. We have to begin with, then, a preliminary cost of education of an average of \$3,600. The next item will obviously be the cost of fitting and equipping

an office; let our estimate be \$1,000, and so far our investment amounts to \$4,600; and taking an interest of 8 per cent., we have from this head an annual charge of \$375 to be raised. Let us now make an estimate of our ordinary annual outlay, trying in each case to strike a general average: Rent, \$300; electricity, \$50; gas and heat, \$50; telephone, \$30; assistant, \$350; laundry, \$50; supplies, \$300; total \$1,130. To this we have the item of depreciation to add and also that of personal earnings, to which we may consider ourselves entitled. The former let us estimate at \$50, the latter at from \$1,500 to \$2,000. Totalling these figures, we have: Annual expense, \$1,130; annual depreciation, \$50; interest on actual investment, \$375; earnings, \$1,800; total, \$3,355. Here we have a fair estimate of what the gross earnings of an office should be, and this will be an approximation of the normal case. We are now able to take the further step to enable us to determine the basis of our charges, to produce this sum. Such an amount is to be raised in a year's time; from the possible working hours of a year we must make some deductions, as, holidays, two weeks; sickness and other causes, two weeks; then, allowing eight hours a day of regular work, with half a holiday on Saturday, we find that there will be approximately twenty-two hundred hours in which to raise the required amount. By dividing this number of hours into the annual sum to be earned, we can arrive at a figure which, it is submitted, will be a compensation both just and reasonable.

Now there may be an apprehension in the minds of some, who would, under other conditions, adopt these methods, that such a change would prejudice their interests rather than improve them. They are fearful of the effect of increased fees upon the public. But, in my judgment, these fears are groundless. In the long run the public is a good judge of high class work and is willing to pay its price. In fact it is a psychological fact that high fees create a belief in the superior ability of the professional man, antecedently to any actual experience of it. And such a reputation is, to one offering services to a community, an invaluable asset. No, there need not be any fear of the consequences of taking the step I propose; the course is too well grounded in sound principle to end in disaster.

As to a practical way of inaugurating such a system, it is the practice in some parts to send short notices to patrons, stating the proposed change, with or without a short explanatory note. If this is not done, the only course would be to give notice to each patient as he submits himself.

We have laid, then, this basis for our considerations. The next question is, What are we to give in return? We have now become scientific in our charges; it remains for us to become scientific in our professional conduct.

Let us look first to the office. We are living in an age when the powers of nice discrimination and esthetic sensibility are growing keener each day; we are also in an age which appreciates, fully, the quality of cleanliness.

When we invite a person of good taste to submit himself or herself to our professional treatment, it is incumbent upon us to extend to him or to her conditions at which even a fastidious taste could not take offence. We have no warrant for asking a patron to submit to the unnecessary discomfort of an ill-arranged and badly-kept office at a time when he is in fact responding to an invitation which he has a right to believe does not include an outrage to his own feelings. I have been considering this from the point of view of the patron, but the astonishing thing about such a matter is that the self-interest of the dentist could ever fail to appreciate the possibilities in this respect. A clean, well ventilated and tastefully furnished office almost supplies a defect in the physician. The patient is, by his first and most lasting impression, made easy and confident and in many cases will be willing to overlook things that otherwise might be obstacles to his ever returning.

We may pass now to the operator. Here, of course, is where the essential qualities must show. First there is his person. It must be spotlessly clean, in white suit, nothing careless; the hands immaculate as Alpine snows. This is essential to a proper treatment; it is due the patient. No person, under such a relation, has a right to expose another to uncleanness or the possibility of contagion. It is a strange commentary on human progress that we should be forced to mention such a fact; but we are only now coming to a full sense of the merit of the old aphorism that cleanliness is next to Godliness.

As in respect to his person, so in his work, the same particular care must be observed. The instruments and the whole apparatus should be kept thoroughly sterilized. Moreover, the methods and the equipment must be modern; we are under an obligation to keep abreast of the foremost scientific discoveries and advances. This is essential. The moment we neglect it, do we take the first step in retrogression. We may never forget that we are dealing with human beings, and very often in most vital relations.

Proper treatment of a patient, too, may and generally does require that there be an assistant, and it should be seen that he or she observe the same scrupulous and intelligent care demanded of the principal.

And we have, finally, the supreme necessity, from every point of view, of the high quality of the dental performance itself. To make one's aim to have every piece of work better than the preceding, to catch the sense of art which never aims but at perfection, to draw from the work as work the satisfaction of having done something well; this is the end of a profession, and upon this, finally, must rest our claim to financial compensation. There is a duty on every one to do his best. It is that to which the patients are entitled, and it is that which in fact they desire, for, paradoxical as it may appear, and apart from the physical advantages given, it is, in the long

run, the cheapest course they may pursue. The heaviest crime of a professional man is that of low aim in his work, and he is not qualified to sit with high minded and vigorous men, who can contemplate with equanimity a slipshod filling or a ghastly set. This is the fundamental duty imposed upon him, as he is a worker in this world, that he do his best, and such is the correlative right of every member of the community in respect to whom the work is done. Here is given the final stroke which determines the value of the economic contribution by the dental service.

I might, perhaps, refer to a practice, legitimate and often profitable, which is frequently overlooked, and that is the volunteering of professional advice. As a matter of fact, there is an implied request by every patient for such a consideration. In submitting himself for any particular treatment, he assumes that he has no defects other than those specifically named; but surely the majority of patients feel that such other defects as may be present will be noticed and attention called to them.

And in giving advice of any nature, let none be given but the best, and this regardless of the person in hand. It should be presented, too, in a manner that will bring home a full sense of the desirability of improved forms of treatment, and with this clear appreciation of his case and the significance of the professional service, generally, the patient will relegate the question of fees to the secondary place where it belongs.

We have now set our young dentist on his way to a successful career in his chosen activity; he is going to be proficient in his work; he has the basis for securing to himself a fair return for his labors; shall we leave him here? Unfortunately too many are left here or at a point short of it. To be able to earn a right to money is not quite enough in this world; to get the money itself, and having got it, to keep it; these are equally important, and to these we must give a slight attention.

We told our young man that he must be scientific in his profession; we tell him now that he must be scientific in his business, and that business is the work of collecting his income and discharging his obligations. And to be scientific here does not mean to keep one's books in one's diary or in one's memory; it means to adopt the system and practice that an ordinary business man adopts; it means to be systematic; it means, in the final analysis, to make use of good sense. We are not engaged wholly in a charitable or benevolent scheme, and yet were we to see the practice of some of our members we would be puzzled for some other explanation. Systematic book-keeping, both as to patients and supplies; reasonable insistence on prompt payments and on business consideration being given to these ordinary business relations between men; these will surely not detract from the dignity and quality of our respected profession.

And assuming that we are in possession of our earnings, in what way shall we invest them? For reasons that are quite explicable, we are not, as a class, shrewd investors. We are too easily carried away by the

startling stories of gold mines and other natural resources that seem so strangely to vanish at the touch of our investment. This is unfortunate—but but it is so.

Against this double folly, therefore, of loose business methods and unwise investment, we warn our younger members. Too many of us have learned by painful and costly experience of these twin errors and we should, if possible, save at least some of those now rising in our ranks from passing through that stage of confusion and blunder. The colleges do not touch the matter; perhaps they cannot do so to any marked extent; but at least some form of advice should be given in order to place the young practitioner on his guard. A few lectures made over to this aspect of our work would not seriously impair the effectiveness of the year's course, and yet they might save an unhappy experience for many in after life.

These, then, are the suggestions which it is the purpose of this paper to make. It is not pretended that the question, as an economic one, has been more than touched upon; the purpose will have been achieved if it results in an intelligent interest being aroused in the subject matter and a just advantage created to the members of the profession in respect to what is now a source of much waste.

If we agree that there is no incompatibility between professional zeal and good business principles; if in our work we set before ourselves the ideal of our best in every case; if we establish the complement to such endeavor, an economically just return; if we supplement these by the adoption of sound business methods; if in short we become scientific in our profession considered as a well defined branch of human activity with many aspects, then we may confidently assert that we are performing our duty to ourselves and to our society.

But I have to emphasize once more the fact that in transactions between men there must be given the *quid pro quo*, there must be the equivalent of exchange, or there is larceny. And we are to remember, therefore, that although we cannot advance beyond the limits of our possibilities we may advance to them. The right of monetary return for our work is based upon the increased effectiveness which we give to men; to that basic condition we must first address ourselves, and with that attended, the legitimate consequences will follow.

We have a limited period during which we may act; age soon creeps upon the weakened arm and the dimmed eye, and as, by becoming members of our profession we have not ceased to be men, within that narrow stretch of years we must provide for those to whose welfare we have dedicated our lives. In the struggle of living we may not all become wealthy, but, as a fine spirit once said of another purpose, we can do more, we can all deserve to be wealthy.

DISCUSSION.

DR. THORNTON: I was reminded of a little incident I saw some time ago where a clergyman was visiting an aged parishioner who had reached an age well over the century mark, and speaking of her history and experience, he said, "Now, sister, tell me in your own way to what you attribute your long life of usefulness and high spiritual attainments?" After looking serious and thoughtful for a few moments, she said, "Victuals." (Laughter.) Now, I am just frightened that if I were to attempt to discuss this paper that I would be exchanging the ambrosia, the food of the gods, for plain ordinary victuals. Do you know, I always go away from a meeting such as this very much discouraged with myself. I feel like the disciples when they said, "We have toiled all night and we have taken nothing," when I listen to such a paper on such a subject and realize how far short I come. When I know—because men say so, and it must be true—that a man in a dental office should always be clothed in Alpine whiteness, I realize it is hard for me to maintain that condition. I may put on a clean coat, but there is a drop of blood or pumice stone or saliva, and the coat is dirty and I feel then I am not measuring up to the standard. There is a serious aspect to this. We talk at all our meetings of bacterial cleanliness and of sterilizing our instruments and so on. I want to tell you honestly I don't know how to do it. I try to maintain ordinary cleanliness. As soon as I get through with a patient my assistant takes the instruments I have been using to the laboratory and boils them. I do not know any better way, and yet all the time I am feeling that I am using certain instruments that it is impossible to sterilize. I try to be as clean as I can and to use the ordinary God-given horse sense to which the essayist referred, and having done that I feel I have done my best; but my best is a long, long way from the absolute condition that we can sit down and write about in our libraries. There was one thing I wanted to say when they were talking about the management of a country practice. I suggested to my friend, Dr. Black, that I could not write a paper on that, but I could write a magnificent one on the mis-management of a country practice. I have been there.

DR. CAMERON: This paper this afternoon comes up quite in contrast with the ideas which were held by dentists even at the first Canadian Dental Convention. If I remember correctly, there was a gentleman there from New York, and he had a paper entitled "Filling Children's Teeth With Gold," and one gentleman, who was a very attentive listener, asked this essayist, "Well, Doctor, under the circumstances of all the difficulties you had in managing that child, and so on, what did you charge for the filling?" and the dentist said—and you could feel it in the atmosphere that there was quite a feeling of disapproval of the suggestion having been made—the dentist said, "Don't worry about that. If you don't get paid here you will get paid in heaven." Well, I know, as Dr. Thornton has said,

that a great many of us expect to get to heaven some time, but I think since that meeting, after listening to and seeing the attention that has been given to this paper, that the dentists are beginning to realize that more business has to be put into their practice. I think this is one of the most important features in a dentist's life, and should be thoroughly discussed.

DR. THOMPSON: I would just like to say that I come from the little town down east from which Dr. Murray comes, and I feel it is only fair to say that Dr. Murray practises the ideas he talks about, and he is not going to wait for his reward until he gets to heaven. He has become richer than a lot of us are ever going to be, and if we can follow up his ideas and make the money he can I am willing to come all the way to Hamilton from New Brunswick to learn how. I thought he was going to divulge some secrets, and I would have liked if he had told how he has kept his money, but perhaps I will find out on the train.

DR. DAY: It just occurred to me that a couple of years ago I read a paper somewhat along the same lines, and in the preparation of it I went over my books for a series of years with the purpose of finding out what the loss was in connection with my practice. I found after I had tried to run my business carefully and make collections and look after accounts as well as possible, and had kept a record of all the expenditures in connection with the office, during a period of twelve years I think it was, my losses were just exactly five per cent. I mean the difference between the actual amount of work done and the cash received was five per cent. I also found in going over my figures that it cost me between 30 and 33 1-3 per cent. to run the business. I thought it might be of interest for some to know exactly what it cost me over a number of years.

DR. THOMPSON (London): Mr. President and Gentlemen: This question has appealed to me very strongly for some considerable time now, and I asked the principal of a business college how this question should be coped with. Taking myself, if you will excuse a personality, I have never had any chance to indulge in business life, and when I started out in practice I knew absolutely nothing about business dealings, and where a man is going to get that is a point that bothers me a great deal. The Colleges are turning out young men well qualified to practise dentistry, but they know nothing about business, and that is where the pitfalls come in. The principal of this business college told me that he attributed the present high cost of living, that is, the amount of money that the farmer is receiving for the sale of his produce, more to the fact that the young students were taken into the business colleges from the country and they were taught more about the primary cost of an acre of land than how much it cost to till it, and they have no idea how much they ought to sell their product for to make good. I think that feature could be well introduced into the Royal College of Dental Surgeons, and it would do an immense amount of good.

PRESIDENT COWAN: I have found that the graduates of the College

cannot do two things. They can make bridges, but they cannot oil an engine and they cannot collect an account, and it would seem to me not to be at all amiss if for two weeks during the term a business man was brought into the college to give a business lecture, and a mechanic to tell them how to take care of the machinery.

DR. DAY: Why in a dental business could an auditor not be brought in and a statement be made of the entire business conditions? A lot of dentists seem to feel that because a dentist does not do much business comparatively with other businesses that they have no occasion to have an auditor, but the very fact that he does not do much business makes it all the cheaper to have an auditor, and that audit shows the dentist where he stands and gives him a true statement of his business affairs.

DR. MURRAY (closing discussion): As I said at the outset, my purpose was not to read this paper for the older members of our profession, but the younger members, in order that they might be saved from some errors which I fell into myself. Now, a young man comes from the country and works his way through college and he knows no more about business than he does about making an automobile. He may be perfect in his profession, and his personality may be everything that is desired, and at the same time his business qualifications are undeveloped. Now, it has been stated that the colleges do not touch upon this, but they could easily do so, I think, without impairing the course. Some one suggested a couple of weeks, but I would say more. It would be a great thing for every student going through college to get such a course, and I say the colleges are not doing their duty to the young men if they do not give them some training in this regard as well as along the other lines.

DR. THORNTON: If you are going to put that into the curriculum, how would you suggest it should be done? You must either lengthen the time, or cut out something that is there already.

DR. MURRAY: I would cut out a great deal that is given in the colleges that is no good for anything, and I would put in these important things. We all know that there are things taught to-day that are not of very much practical use to a man practising dentistry, and I think some of it could be cut out. I think Dr. Thompson from my own city must have something in view, but I really do not know what he means by all the complimentary remarks he has made about me. Now, I am not ashamed to say that I came off a farm when I was a young boy, but if I had had some such training what little money I have got to keep me out of the poor house would have been augmented fourfold to-day. Experience is a good teacher, but sometimes it costs you a lot. Now, a young gentleman down here spoke about auditors. I would hardly think that would be necessary. A man should be qualified to be his own auditor. Another thing I would like to mention is that it is a good deal better for yourselves if you look after your own business and have a thorough knowledge of your own books,

and not leave it all to your bookkeeper, but at the same time let your office assistant do the work. Do just the same as any intelligent thriving business firm will do: have the supervision of it yourself, and do not let all the responsibility fall upon your assistant. As I said before, it is a subject which I think should be considered more and more every year, and I would like to emphasize it and impress it upon the minds of the younger men who will soon take our places. We will soon pass out, but they can profit by our experience.

DR. WEBSTER: I would like to move that some course in business should be given in the Dental Colleges. For the past two or three years the Royal College of Dental Surgeons has made some effort along this line. During the past year we have had, I think, four or five lectures to the senior classes. We had in Toronto one time Dr. Brush, who has done so much towards improving the business end of dental offices, to give an address to the students, and we had Dr. Clapp give an address on business to the same class. I gave two hour lectures myself on business methods, and Dr. Trotter gave an hour or two on business methods in practical dentistry. I believe it is a good idea to have some business man give such addresses. I also wish to say that the Toronto Dental Society never had a more enjoyable evening than when they had Mr. W. T. White, who is now the Honorable Mr. White, give an address on "Investments for Dentists." That is, how dentists should invest their savings. Such an address ought to be given to every graduating class, and it might be a good thing for such an organization as this if we could get the Honorable Mr. White to address us. The President said there were two things a dentist could not do, collect accounts and oil an engine. There is some difficulty in teaching students how to oil an engine. You know there are dental manufacturers and dental supply men who know more about these things than any dentist does, and it is very difficult to get the services of one of these men to give instruction without getting into trouble. You can quite understand that if a manufacturer of a dental engine is permitted to describe how to take care of that particular engine before a class, all the other manufacturers want the same privilege, and immediately you get into trouble. Then a school must be managed in such a way that it controls such things.

It being six o'clock, p.m., the convention adjourned.

TREATMENT OF CHILDREN

DR. J. G. O'NEIL.

Mr. President and Gentlemen: The subject which I have written upon in this paper is, according to my line of thought, one of the most essential subjects in the dental profession to-day. I consider that there is no other subject which comes within our scope of thinking, and which may be directly applied to our professional work, that could hold a more prominent place in the minds of the progressive, ambitious ethical members of the dental profession.

Had I been writing this paper fifteen years ago, I should never have made such a statement as the above. To-day we are living in a new era of thought, an era that is pregated with the most wonderful advances in science, commercialism and philosophy. At the present day we are living in the most enlightened age in the history of the world, and when we stop to ponder, we are amazed at the wonderful ideas that have emanated from that wonderful part of our anatomy, our brains.

During this rapid progress which has been taking place within late years along educational and scientific lines, the dental profession has advanced side by side with all the other professions and sciences. I shall go further and say that I do not think there is any profession or science—comparatively speaking—that has advanced as rapidly as the dental profession. This advancement is of a twofold nature; it is of the greatest benefit both to the dentist as the professional specialist and to the laity as a means of education along scientific lines. The laity are becoming educated as well as the dentist, hence a new era has crept into our code, and to-day if we should repose for a while and sit down to write out that extremely large code that makes up the profession of dentistry, we should write first in the order of importance, the treatment of children.

There was a time when the child of tender years was an unknown person to the dentist. With such a movement being propagated at the present time by the members of the dental profession and other educational bodies, the laity are becoming more enlightened, and accordingly as that enlightenment increases more children will be sent to the dentist, and the number will always be increasing.

This subject, which I am trying to discuss as intelligently as is within my power, is of a very broad nature, and almost, I might say, illimitable in scope. I may truly say that it would not be difficult for one to write a large volume upon this very subject. It could easily be divided into different stages, as to age, sex, temperament, etcetera; but as I have only been accorded a certain space of time to read this, it cannot be done. It is my intention to make this essay as universal as possible, so that the remarks may have a general application instead of dividing each one into its own

special phase, and making the special application.

In dealing with the subject, I wish to impress upon you that this essay is written more from a psychological than from a physiological or a pathological standpoint. The dominant note is principally along psychological lines, though later in the paper I hope to touch briefly on pathological and physiological conditions.

Children are the greatest blessing bestowed upon man. They are little angels sent from Heaven to make this world a Paradise. They come to fill our hearts with love and gratitude, that for a few short years of our lives we love and are loved into being decent men and women. They make it possible that the law of love may rule supreme in our hearts; then it is a privilege to the child to obey. It is sweet pleasure to be permitted to do useful things and the whole family is filled with sunshine, love and happiness—the greatest happiness that can exist on earth.

There are two phases to be considered under this subject, and the most important is the management of the child, the second is the treatment of all conditions relating to the dental organs. The first must be accomplished before the second can be commenced, and when the management of the child has been accomplished, the dental treatment is comparatively easy.

Our relations to our child patients should always be of a personal nature, and never of an impersonal one. This fact does not apply so much to adults as it does to children. To make my point clear, let me make this illustration: If I want to take a journey, I go to the ticket office of the railway company and pay my money—what sort of a being sits there matters little to me. He may be a nice person, obliging or disobliging, nay, so far as I am concerned, no person is necessary at all. The personality of the ticket clerk does not enter into my case.

This is the impersonal relation. Now apply this in our dealings with child patients—I don't care a jot for the child himself. To me he is merely a means to an end—the collection of my fee, that is all. It is a pure business relation, cold and dry and unemotional. I am using him as a tool, nothing more. I make no appeal to the child's good-will, nor do I make any favorable impression thereon. I regard him merely as a psychological machine to be treated by me, but I lose sight of the fact that I should be drawing that child patient towards me by a bond of sympathy and child love. There is nothing moral, nothing ethical, nothing personal in our relations.

Now let me give the personal relation—the only attitude which the dentist can adopt and treat children with any degree of success. Here I regard my little patient not merely as a psychological machine to be worked on mechanically, but as a personal being to be acted upon ethically. I regard the child as a subject of feelings and moral dispositions, a being who is affected by my approach, capable of taking a personal interest in

me, and one whom I must draw to me by appealing to his good-will and creating a favorable impression of me. My motives in the personal relations are dominated by all the feelings of a man's superior nature and in the impersonal my relations are solely and wholly dominated by mercenary ideas.

There is nothing so true as the old saying, more especially when applied to children, as "first impressions are always lasting." A child either likes or dislikes you from the very first meeting. Create a favorable impression and they are your patients for life; create an unfavorable one and the chances are that you will never see them again. The mind of the child is very plastic and can be moulded like soft clay, creating a favorable impression, the mind has grasped it as it fell upon the soft table of memory and now it is fixed there for all time.

As many of us are well aware, a difficult problem that we have to contend with in the treatment of children, is their natural fear of everything pertaining to the dental office. They are often brought in mortal fear and under a great nervous excitation, all brought on by the weird tales that they have heard narrated by their parents or elders. Had the children not heard these tales they would occasion the dentist a great deal less worry in their management.

In the case where the child is not too young, it is better for the dentist and better for the child patient that it should not be accompanied to the office by the parent. If the dentist is possessed of any ingenuity whatever along the lines of handling children, he will accomplish more by the parents being absent. The parents as a rule dictate to you how to handle their child, and if you make a short study of the character of the child you will soon know better how to manage the child for your own particular ends than the parent. When the parent is present the child instantly looks for sympathy from the parent, but the absence of the parent entirely obliterates this thought from their minds. The absence of the parents enables you to go on with your work more smoothly, with less emotion, and your results and ultimate ends are reached more quickly.

Do not deceive the children, nor scold nor humiliate them. Love and appreciation are wellsprings of genius. Take heed that you do not slap them and subject them to harsh words. The sensitive consciousness of the child is the priceless gem of gems. Mar it not.

Has the dentist any right to upbraid children because their judgment or lack of it leads them to do that which our judgment tells us is not wise?

Have we a right to assume that they ought to know better, and then censure them because they do not do what we, in our maturer wisdom, think best?

Children in the dental practice are not difficult to manage, ordinarily speaking. They are perfect within, and their bright, happy, open countenances are proof of it. How important it is that children be guided by a

feeling of love rather than force. Being cross and irritable with your child patients injures not only the children, but your own professional standing. If one is going to conquer by force why not resort to all the nobler forces of man's higher nature, such as sympathy, kindness and patience, which are planted in the breast of every man, though they may lie dormant.

If while you are operating for your little patients, they do something which irritates you greatly, do not lose patience with them, but be firm, and exercise control. Do not let them have their own way entirely, but try to teach them that which is necessary to carry on your work. But always remember to be kind and gentle. We should always remember we are handling sensitive flowers. Do not expect too much. Do not think the child should know better. The mind of the child is not sufficiently developed to retain and execute rigid orders. Nothing should be taught a child, while under the treatment of the dentist, that is not known to be absolutely true. Children are wonderfully sensitive and susceptible to environment. There ought to be the most perfect systems worked out by the members of the dental profession in this particular phase of our work, viz., the treatment of children, whereby the environment for them would be conducive to the very highest development.

In practically a large majority of cases there is no affectation in children. In their minds it is an absolute like or dislike. They say exactly as they think at all times—there being little deceit in their make-up. On account of the foregoing reasons, children are probably, in their characters, the truest patients we have. If they are pleased, they are pleased absolutely. There is no intermediate for them. It is either a definite one thing or the other. They are vastly different in this respect from adults. For this reason they are the most desirable patients a dentist can have—after he has passed that point where he understands how to manage that child.

A dentist who is versatile in his character has much in his favor, when he has children under his treatment. Because he is a man who can readily adapt himself to conditions and environments.

When dealing with children, he has to forget his staid manner, which he is accustomed to while dealing with adults, and take on, I might say, a more frivolous manner. He has to take himself back to the days of his own very youthful life, and enter once more into the spirit of childhood.

Children are appreciative for the efforts expended by the dentist. They appreciate his work in their own peculiar way. They always speak well of the dentist who has been successful with them, and by this means alone will always be increasing his practice.

The men of our profession who are of a highly nervous temperament would be further ahead in the long run if they would not attempt the management and treatment of the child in the operating room, because his power of resistance along certain lines is low, and when such is the case he is easily irritated and has little patience. Unless he is prepared to delve

deeply into his store of kindness and patience and use them in unlimited supply, he had better abandon the idea of treating children in his dental practice. Nothing should be done for children in the way of dental treatment upon their first visit to a dentist. If there is any pain, relieve it, take a short time in trying to become acquainted with the child, then dismiss your patient. Don't hurt them upon their first visit—this is very important to remember. The necessity of short sittings for children need scarcely be mentioned. Half an hour at the longest is sufficient for the majority of cases. It is a very bad principle to give children long appointments and to tax their energies to the utmost, for when you are finished they are utterly fatigued. Learn and try to remember the child's Christian name. The children are similar to adults in this respect. They like attention, and surely will feel hurt if you overlook them. The fact of your knowing their name, and being able to call them by it, gives them a greater confidence in you and a stronger attachment to you, and it helps to break down the barriers of reserve and shyness, fear and lack of confidence. In a short time they begin to feel that they have known you for a long time. If you meet them outside of your office be very sure that you always speak to them and you will find that it is another step gained along the lines of progression in their treatment.

While operating for the children try to distract their minds from the thoughts of the operation in progress, by means of talking to them. Try to learn what the children are interested in, and talk along that subject. Tell them childish stories, and ask them about their dolls or their teacher or anything which you may think will interest them, but the main thing is to try to distract them. What interests one child will not necessarily interest another, but a little study will soon reveal to you just what things to talk about to get the child interested.

In this portion of the article which I am now presenting to you, I propose to deal with the pathological and physiological conditions in the treatment of children's teeth, also intermingled with some technique.

In early childhood, of course, we have only the deciduous teeth to deal with, and there is no more important part of our work than the care and proper treatment of these. Being the forerunners of the permanent teeth, their condition, and that of the oral cavity in general, greatly influences the formation and eruption of these. Every dentist who has many children under his care for pathological conditions pertaining to the oral cavity, and the teeth, should be familiar—or else he should have a chart in some place where he may look it up with readiness—with the time of eruption, calcification and decalcification.

When we are using such drugs as arsenic, carbolic, silver nitrate, etcetera, which produce a destructive metamorphosis when coming in contact with soft tissues, and such drugs as cocaine that produce anesthesia by a contraction of the blood vessels and by acting on the terminal nerve filaments

of the sensory nerves, you will readily see the extreme necessity of knowing these essential points pertaining to calcification and decalcification of teeth. Now you all know the trouble given with arsenic forced through a large apical foramen, likewise with cocaine, and for these reasons it behooves us all to use these drugs with discretion in children's teeth, and to familiarize ourselves with surrounding conditions.

We all know full well that the pain and suffering that the children undergo is more severe, comparatively speaking, from deciduous teeth than it is later on in life when the permanent teeth are erupting, and that the discomfiture attending the eruption of the temporary teeth is more injurious to their growth and development than when they are older, because their vitality is greater and also their power of resistance is stronger. Many children who have been credited by their teacher as lacking intelligence have only been suffering from some dental malady unknown to the parents or guardians of the child.

In small cavities in deciduous teeth where I have an exposure of the pulp, the technique which I have found to be very successful is this: Remove the decalcified dentine, mix up a paste of oxide zinc and oil of cloves, put this paste over the exposure, cover this with sanoral varnish, and fill in your cavity with oxophosphate cement.

In simple cavities in deciduous teeth not involving the pulp, I have always inserted one of two fillings, either amalgam or oxophosphate cement. I have never used copper amalgam, so I cannot tell you anything about it as a filling for children's teeth. The choice of a filling depends upon the location and the temperament of the patient.

In operating for children I use the engine as little as possible. I do as much as I can with spoon excavators, and when I do use the engine I find that the use of small carborundum stones is much preferable to the little patients than burrs. I have had children as patients who absolutely refused to allow me to use the engine at all, and I have had to resort to spoon excavators entirely. After all, if the spoon excavators are sharp and used judiciously very good results can be obtained. According to my mind the engine is being used very often where we might use excavators, because we get quicker results, but cause our patient more pain. If it takes a little longer by using an excavator, and will greatly reduce the pain, by all means we should use it, and our results in the long run will be better and more quickly achieved.

In the case where the pulp has become putrescent in the deciduous teeth, which is the most prevalent of all pathological conditions relating to children's teeth, the technique I adopt is as follows: Open up the pulp chamber; allow the pus to drain for a couple of days; have the patient come back, and insert a treatment of formalin and tricresol; allow to remain for two or three days, and finally make up a paste of oxide zinc formalin

and tricresol, insert this into the pulp chamber and cover over with oxo-phosphate cement and insert amalgam over this, or else make the whole filling of cement.

A very necessary consideration in the treatment of children's teeth is to watch the condition of the first permanent molar carefully. This tooth is one of the most important in the entire arch. It is the chief standard bearer of the jaws during the period when the deciduous teeth are being lost and the other permanent teeth are coming into place, and if lost early invariably results in the jaws dropping closer together than normal, which materially detracts from the force of character of the face. When lost early it also produces a malocclusion. In view of its early eruption it is peculiarly susceptible to decay, and should therefore be watched most carefully and preserved by a filling inlay or crown.

One of the chief functions of the dentist is to educate the children to the importance of properly caring for their teeth, and in respect of the first permanent molar it may be said that this education should begin with the parent before the child is of responsible age, so that the frequent error of mistaking this tooth for a deciduous one and allowing it to go by default should not be committed. Parents should be instructed to bring their children to the dentist not later than the third or fourth year, and impress on the parents first and then on their children, the importance and necessity of oral hygiene, that we shall have their constant and efficient co-operation in our efforts along the lines of preventive dentistry. When we have accomplished this we may not have so many fillings to insert for such and such a fee, but we shall have the knowledge that we have been instrumental in allaying the progress and preventing the growth of one of the greatest maladies of the human race—caries of the teeth.

DISCUSSION.

DR. DAVY: I regret that I have been unable to give this important paper as careful consideration as I would like. I only received the paper about noon and have had only a few minutes to look over it. Perhaps no more important paper appears on the programme of any dental convention than that involving the treatment of children. The treatment of children will vary as widely as the different dispositions of the children who come in contact with us in our offices, and depends largely on the personal equation of the dentist. There are some men who do not care for children, and consequently we can expect when children arrive in their offices that their care will not be as great as it should be when dealing with these little ones. As has been mentioned, the line of education to-day is looking forward towards the children. In all our schools in the larger cities and centres our educational committees are opening out branches looking towards the care of children's teeth, and it is rightly so, because in any line of education we have to get the children if we are to have them

when they are adults as we would wish them. Children oftentimes have been spoiled by their parents, guardians and nurses and friends, and their little schoolmates, by telling them all sorts of fearful tales about the dentist and his instruments, and all the terrible things he has and does, and many of these fears have to be allayed, and as has been suggested, it depends largely upon the personal equation of the dentist as to the means he shall adopt, and to his liking for children and understanding of their little ways and the things which appeal to them. Once the first meeting is successfully over with the little patient the operations should be of the very shortest period. Dr. O'Neil mentioned half an hour, and I suppose he intended that for children about the age of nine or ten years. For small children of four or five or six years of age, ten or fifteen-minute sittings are plenty long enough. Find little trinkets or toys, or little boxes, or some mercury, or a sheet of tin foil, or something like that, for the children to look at, and it will distract their attention from the work. Also some stories, such as Mother Goose rhymes, and so forth, are pleasant to the little children and distract their attention from their little troubles. We must not forget that the troubles of children, while they appear trifles to us, and we think they should not bother these children, are as great as some of the greatest calamities that could befall us, and we should remember those conditions and endeavor to avert those troubles which to them are so great. We sometimes find it very difficult in the treatment of children to even get them into the dental chair, or permit us to make an examination. I recall one little patient who was brought into the office six times before I was able to make an examination or even to get a view inside of her mouth, and then she was very timid. Such cases as that one sometimes will puzzle a dentist greatly. We see a great deal of work to be done and an operation is practically impossible, and I have found splendid results coming from the use of silver nitrate in those cases. I have two cases now, a little girl five years old and another one six, and with them I have not been able to do anything else but make applications of silver nitrate for the past two years. Their teeth are getting very bad, but I am pleased to say, viewing them as we only can by microscopic examination, it seems as though the decay was practically stopped. Of course I make these applications quite frequently. Another case where I found it difficult to get proper applications I used oxophosphate of copper cement. I remember one case of a girl seven years old. When I first saw her I found the two first molars were badly broken down. I could not get a proper operation on the cavities unless I used an anesthetic, and I had some little experience with the preserving properties of oxophosphate of copper cement, I inserted two fillings in those two molars. Of course oxophosphate of copper is pretty dark and you have to take a chance, but I had to save those teeth. I removed the oxophosphate of copper fillings this spring and I expected to find the pulps dead. I had expected trouble long before this, because I had not been

able to get anywhere near the material ground off that I should have, but I was surprised. That dentine was as hard as flint, and the pulps were in what seemed to be a perfectly healthy condition. Those two remedies I have found in very difficult cases to be most successful. Copper amalgam I believe also has a therapeutic value when inserted in children's teeth. I will not detain you any longer.

DR. MAGEE: I had intended saying a number of things that Dr. Davy spoke of. There is one phase of the matter that Dr. O'Neill did not touch upon. He spoke of the kind of love that should be expended upon children. That is a very, very necessary thing. There is also a class of patient that neither wheedling or bribing or coddling will touch, a child who will not do anything for its parents or anybody else, and he is brought to the executioner, as most people think, to get relief from something they cannot endure any longer, and with those children force has to be exerted. When a case of that kind presents itself you have to deal very kindly with the child. That is where kindness comes in. You talk to him—because it is generally a boy—in the kindest manner, and tell him in the kindest manner what has to be done. It is usually a case for extraction, because it has generally reached that stage. You tell him you are going to take that tooth out, and you do not make that statement unless you are prepared to carry it out. You are not going to jump right at him there and do it, but you tell him he is going to have it out, and tell him so and so, and the whole performance is laid out before him, and you watch your opportunity and grab him. You don't grab him until you know you can hold him. Have everything ready. Sit him down and hold his legs, and get his right arm in behind you and the left one comes up in this fashion, and unless he is a pretty vigorous child you have got him where you want him. I have had two failures in my experience, and only two. One was a little girl about twelve years of age. I was very dubious about undertaking it, but a message came from her mother and father, and they said it must be done. I just got the patient to the place where the performance was going to be finished, and my maid being somewhere else, I asked the sister to hand me the forceps. In the struggle the forceps had just got beyond my reach, and she begged that it should not be done, and it was all up. The mother had to come with that child, and spent over an hour with her, and broke quite a big-sized stick over her, before we could manage to have that bit of work performed. But after you have told the child what is going to be done and you have got him helpless and have got the forceps, he will sit more quiet than you this minute, and when all the excitement is on the tooth doesn't hurt him at all. Now, that youngster you will always have for a friend ever afterwards. That is a fact. I told you I had had one failure, but I guarantee if the parents leave the child to me, or anybody else who will treat him in the same way, you will manage him. I had one experience with a boy twelve years

old who had to have a whole lot of work done. His mother brought him to me in despair, and he was brought to the door three or four times, and he bolted, and finally I told the mother if she would leave him to me I would manage him. I told her it would probably take three or four months to accomplish what had to be done and it would cost a good deal of money, but she said she did not care how much it cost or how long it took as long as I saved the teeth. One of the reasons why the child was in that condition was because they had two or three children before and they had corrected them and they lost them, and they thought it was a judgment on them for punishing the children, and the next that came along was allowed to do anything he liked. Before three months were up that boy sat in my chair, and he said to me, "Do you remember what a little fool I used to be?" Now, I treated that boy in the same way as the others, only he didn't have to be held. I had to devitalize two teeth, and, I think, crown two. He was about thirteen years of age, and when I got through he didn't flinch at all. He appeared to like a little grinding. Now, you try the way I say and you will have that child become a friend for life. You tell them exactly what is going to be done and when it happens they know you have told them the truth, and they respect you.

DR. WEBSTER: I am not sure if there are any authorities here on the question, but I thought the "strangle-holt" was barred.

DR. O'NEILL (closing discussion): In this modern day I do not pretend to be a specialist. I have just given a few observations I have gained in the little experience I have had. Last Christmas, in coming east, I jumped off at the station and the first man I noticed on the platform was Dr. Cowan. I went up to him and shook hands with him, and I thought he was rather cool, and I came to the conclusion that he didn't know me. After I went up to him he said, "Oh, I know you now," and he was not so reserved. Says he, "By Jove, I thought you were a man that was bothering me about a Government job." No wonder he was cool. He said to me, "Now, I want you to give a paper." I said I preferred to listen to the older men. Still I do not think it is necessary for a man to have grey hairs and a beard in order to discuss a subject on the treatment of children, because a man gets to a certain point when he is just as capable of studying human nature as the older men are, and in the treatment of children it is probably observation that helps men most of all. Now, I might tell you of a couple of cases which might help you a little in your practice. In one case I know for an absolute fact where a child was going to a dentist who was associated with other dentists in his practice, and he was operating on this child. The older dentists had tried to operate, and they could not, and he gained this patient over. In due course of time this young man left this other dentist and started for himself, and when this child had to have more dental treatment his mother wanted him to go to their regular dentist, but he said, "No, I won't; I will go to Dr.

So-and-So." Well, that young dentist got that child and through him the whole family as patients, and they were very desirable patients indeed. It just goes to show the influence these little things have. In some cases the parents are very sensitive about their children. Two little girls came into my office one day and one had an appointment for five o'clock and the other for four-thirty. The child that had an appointment for five o'clock came in at twenty minutes to five, and I knew that child had a music lesson and I took her first. The other child waited and I treated her, but when she went home the mother called me up and said, "My child is just as good as So-and-So's child." I said, "It isn't a question of your child being better than anybody else's child, but," I said, "I don't wish to discuss this point over the telephone. If you will come to my office we will reason it out." She did, and everything was amicably settled; but I just give you that as a suggestion. Now I am glad to say that in the city where I live we have inspection of school children's teeth. We are probably more progressive along those lines than many larger places. I thank you very much for the hearing you have given me, and if I have said something to set you thinking I am quite satisfied.

PRESIDENT COWAN: I make no apology for asking a young man to take part at this convention. I will do it every time. The sooner they get experience the sooner they will be thoroughly competent men. Tomorrow evening is our business session, but we will start on time and take up the discussion of Dr. Hartzell's paper. Before adjourning it is necessary to appoint a nominating committee, and I have jotted down the names of some members whom I would like to act in that capacity, and they can bring in a report to-morrow evening: Dr. Thornton, Toronto; Dr. Nolin, Montreal; Dr. Garvin, Winnipeg; Dr. Macdonald, Yorkton; Dr. Doyle, Calgary; Dr. Magee, and Dr. Thompson of Halifax.

At 10.30 p.m. the meeting adjourned.

EVENING SESSION.

Tuesday evening, June 4th, 1912, 8 o'clock, p.m.

THE PRESIDENT called the meeting to order and asked Dr. J. E. Rhind to read his paper on

COMBINATION OF SILICATE CEMENT AND GOLD INLAYS

J. E. RHIND, D.D.S., L.D.S., TORONTO.

DR. RHIND: The subject of this paper is clearly defined by its title—gold inlay in combination with silicate cement, for esthetic reasons.

The class of cavities for which this method is adapted is limited, but in that class of cavities it has such advantages over other methods of restoration as to make it well worthy of consideration.

It is particularly indicated for restoring a broken corner of any of the six anterior teeth.

The technique in such a case is in the preliminary stages the same as for gold inlay alone, so I will merely outline the procedure.

If caries has involved the pulp and it has been treated and the apical end of the root filled, an irridio-platinum post is fitted to the canal, and left long enough that it can be bent and extended into the cavity sufficiently far to attach itself firmly in the inlay wax. At the incisal edge the cavity is extended to reach enamel supported by dentine and to permit withdrawal of wax inlay. As much as possible of the labial plate is left standing, especially towards the base or seat, to give the inlay additional support, while on the lingual side it may be cut further back, facilitating removal of wax pattern with post attached. The seat or base is squared, the enamel margins polished with sand-paper discs and the post placed in the root canal.

When the pulp is not involved a step must be cut across at the incisal edge. Except in the case of a thin tooth, this can be done without shortening the tooth. Cut a groove with a small disc carborundum stone back of the labial enamel plate, giving a fairly long bevel to the labial wall of this groove at the labio-incisal margin, then follow out this groove with a small square end dentate fissure burr, giving the latter a slightly labio-lingual movement at the end of the groove to make it somewhat wider there. It will not likely be necessary to cut away so much labial enamel to obtain the proper cavity outline. To permit withdrawal of wax pattern, line the pulpal wall with oxyphosphate mixed stiff, square the base of cavity and polish enamel margins. Just after pressing the inlay wax into the cavity it is advisable to chill and withdraw it as a test that the cavity preparation has been such that the wax pattern will withdraw when ready for casting. This having been done, the wax is returned to place and pared and scraped to form, as for gold inlay only. While still in place it is chilled and with spoon excavator No. 19 or 20 the wax is cut out of labial surface to 1-32 of an inch from incisal edge. This margin must be left untouched to give a strong biting edge. To obtain retention for silicate a slight groove is cut in the scraped labial surface or cavities made with small inverted cone burr, used in the hand, of course. These may be sharpened after inlay is cast.

After casting, the inlay is cemented in place and silicate cement inserted in the cavity of inlay to complete the filling.

When both mesial and distal corners of an incisor are broken the U form of the inlay makes its retention easy, while the slight margin of gold shown is not objectionable. This method of restoration has several advantages over others. The technique is much simpler than for baked porcelain tip; there is no cement joint; when a post is not used, the step at the incisal edges gives firm retention, and a good color match of the silicate is obtainable, and it can be inserted for a fee which brings it within the means of all patients. It is not nearly so fatiguing to patient or operator as the

insertion of a cohesive gold filling, while the display of gold is avoided. The insertion of a crown, which frequently requires the destruction of much sound tooth structure and sets up conditions favorable to gingival irritation, can often be delayed for an indefinite period of time.

A suggestion which I have lately seen to assist in getting a good match of the silicate cement, is, to match a tooth from the shade guide to the tooth in the mouth, lay it on the glass slab and mix the powder in such proportions with the liquid as to give the shade wanted.

I have not found that the gold backing made it difficult to match the shade in the mouth. In perhaps one or two cases I have first lined the cavity in inlay with oxyphosphate approximately the color of the tooth.

The fact that we can conserve tooth structure, make a restoration which is reasonably permanent, which is within the range of the technical skill of every operator, which meets all esthetic requirements, should commend the method to us all.

DISCUSSION.

DR. W. A. BLACK: Mr. President and Gentlemen: I have been asked by the committee to open the discussion on the paper you have just heard. Whatever I have to say will be brief, and I trust to the point.

First of all, I would like to congratulate Dr. Rhind on his clear and concise presentation of the subject. His paper was of necessity short, but to my mind it covered the subject pretty thoroughly. I may say I had the privilege of reading this paper a few days ago, and feel that there is little, if anything, I would add or wish to criticize.

The essayist has gone pretty fully into the technique of his preparation for gold inlays in cases where he wishes to combine them with silicate fillings, and I would suggest only that the cavity for the reception of the silicate cement be fairly deep, so that there may be a sufficient bulk of the cement present to preclude the possibility of the gold interfering with the shade of the silicate filling. This would add also to the permanency of the filling. I think the suggestion Dr. Rhind made as to matching the cement by the use of the shade guide a good one, as one finds it perhaps more difficult on account of the proximity of the gold to get a good shade in the combination filling than in an ordinary silicate filling.

The essayist said that this form of filling was particularly indicated for the six anterior teeth, but in many cases it may be used to advantage also in the restoration of the first and second bicuspids where the display of gold might prove objectionable. Of course, as Dr. Rhind remarked, the only advantage of these combined fillings is the esthetic result. This result depends wholly on the operator's skill in blending and shade matching, and I think we will all agree that a large gold inlay, objectionable as it may be, is preferable to an ill-matched or poorly shaded silicate filling in combination with a gold inlay.

These silicate combination fillings when well protected by a margin of gold may be considered as comparatively permanent, and should they fail in course of time very little inconvenience is caused the patient by the replacing of them. I have one of these combination fillings in my own mouth which was inserted two years ago and is still doing good service. I may also add that silicate fillings serve very nicely in the repairing of gold fillings under some conditions.

In conclusion, I may say I would like to have the essayist specify which of the various silicate cements he has had the greatest success with in his practice and in this particular kind of work. Thanking you for your kind attention.

DR. PRICE: Mr. President, I would like to ask what is the objection to using some platinum in the casting, so that you could have a temperature safely of 2,000 degrees, and have something more lasting than silicate cement?

DR. MASON: In regard to the kind of silicate used, that is a matter of what each man finds to work out best in his own practice. I use santarac, but other men may get as good results with some other silicate. With regard to the question asked by Dr. Price, I do not see why that could not be used if a man wished to do that. This is a method that can be used without the use of porcelain at all, and gives good results in a short time when silicate is inserted into the cavity.

DR. DORAN: I have a sample now with me of what Dr. Price asked about, that we had in our clinics down in Montreal.

(The report of the Burlington Convention will be continued in the September issue.)

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No. 8.

DENTAL HOSPITALS AND DENTAL SCHOOLS

Dental hospitals and dental colleges or dental schools are organized upon a very different plan in Great Britain and Ireland from that in the United States and the majority of cases in Canada. Just now, when dental clinics and dental hospitals are being organized in Canada—some of them supported wholly by charity and others by the State—it might be of interest to look into what is done in the mother land.

In general there seems to be two distinct plans of organization. One, in which the ultimate good of the patient is paramount, and the other where the teaching of the dental student is the first thought. There is, we are sorry to say, in some cases a third plan—which has been blamed for all the dental quackery in America, and to some extent abroad—where financial gain for the promoters is the sole purpose of the establishment of the institution.

In Great Britain the first plan seems to be the only one followed. In Canada there is now one dental hospital and school established as in Great Britain. There are dental hospitals for the poor being established both by charity and by the State, with no thought of establishing a school. The majority of the dental schools in Canada are established to teach dentistry. The hospital department and the patients are adjuncts. In most cases the patient not only submits himself as a teaching model, but he is also expected to contribute to the support of the school by paying a fee for the operations performed. It is in this rather double dealing method that some Canadian and American dental schools are at variance with the established plan in Great Britain. A fee is collected from the student to teach him dentistry and then he sees collected a fee from the patient for the very operations which he has paid the school to teach him. A lawyer is not permitted to ask for or collect a fee from two clients for the same transaction. In fact, it is a criminal act for a commissioner to collect a fee from both the purchaser and the seller. How nearly do some dental schools come to doing this very thing? It is only begging the question to say that the fee does no more than cover the cost of the material. In the first place, the student who is being taught ethics at college knows this is not true, and in the next place, if it were true *he* knows, and everyone knows, that the patient is essential to the contract of the college with the student.

The plan in Great Britain is clear cut. The patient brings a card from a donor to the hospital, which entitles him to free treatment. The student pays a fee to the school for his instruction. The student pays for his instruction, the public support the hospital. The school and the hospital are separate organizations. The duties of a dental school are one thing, and the duties of a dental hospital are another; one is essential to the other. It is worth considering how they can be best combined. It is difficult to see how the public can be best served outside of a State institution.

ADDITIONAL SUBSCRIPTIONS TO "THE BRODIE MEMORIAL FUND."

Dr. W. R. Greene, Ottawa; Dr. W. J. Brown, Toronto; Dr. Geo. Gow, Toronto; Dr. F. Williamson, Hamilton; Dr. E. M. Fulton, Hamilton; Dr. R. McDonald, Hamilton; Dr. J. A. C. Hoggan, Hamilton; Dr. Frank Adams, Toronto; Dr. J. J. Loftus, Toronto; Dr. Andrew Bram; Dr. P. P. Winn, Alvinston; Dr. C. N. Simpson, Clinton; Dr. J. S. Chambers, Toronto; Dr. J. E. Rhind, Toronto; Dr. Brownlee, Grimsby; Dr. O. A. Marshall, Belleville.

DENTAL EXAMINERS MEETING.

The Thirtieth Annual Session of the National Association of Dental Examiners will be held at the New Willard Hotel, Washington, D.C., beginning Friday, Sept. 6th, 1912, at ten o'clock a.m., and continuing until adjourned. Delegates expecting to attend are advised to make reservations early on account of the meeting of the N.A.D.F. and N.D.A.

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Original Communications

PYORRHEA ALVEOLARIS: ITS ETIOLOGY AND TREATMENT

THOS. B. HARTZELL, D.D.S., MINNEAPOLIS, MINN.

Read before the Canadian and Ontario Dental Convention, Hamilton, June 5, 1912.

Mr. President and members of the Canadian Dental Association and Ontario Dental Society: The subject upon which I have the honor to address you to-day is the time-worn subject of Pyorrhea Alveolaris, its etiology and treatment, with special reference and emphasis upon the relations which exist between oral sepsis and constitutional infections.

In beginning this discussion I desire to say that for my present purpose I shall use this term to convey the idea of inflammation of the gum margins with progressive destruction of the underlying bone. Much has been written upon the subject of pyorrhea, but I take it for granted that this great organization desires no fine-spun theories regarding this disease. There is an old saying that "nothing succeeds like success," and after an experience of many years in fighting this enemy of the human race I have reached some practical conclusions which give me the courage to state to you that, though I do not know with absolute certainty whether or not there is a specific micro-organism responsible for this disease, I do know that it is within the power of every dentist to bring about a cure of at least 80 per cent. of all the cases which shall present themselves for treatment, and by cure I mean that destruction of bone ceases, that the clinical evidences of inflammation pass away. This conclusion is based upon observations and treatment of some 1,000 cases which it has been the privilege of the writer either to personally treat, or closely observe and control their treatment by others. It would give me the keenest pleasure to be able to state authoritatively that there is a specific micro-organism responsible for the *continuance* of this so-called pyorrheal inflammation.

There is not the slightest doubt in my own mind that when the inflammation is once well established and a lesion of the gum margins exist, thus

admitting infection, that the inflammation from that time forward is certainly increased by bacterial influence. But at this point in my discussion I might ask, what do we actually know regarding the etiology of this disease? I think we can safely say that Dr. E. S. Talbot laid the foundation for the pathology of pyorrhea alveolaris by his research, which he

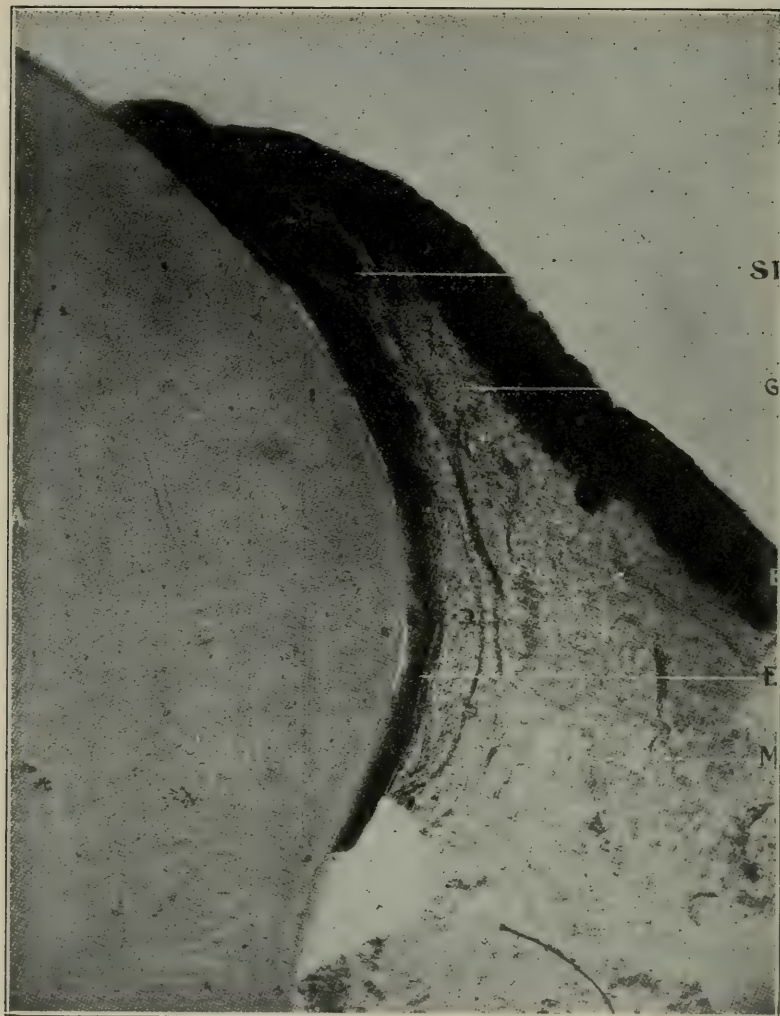


Fig. 1.—Longitudinal section of tooth and gum tissue. Slight gingivitis. Dog. A, Enamel; E, Epithelial tissue; G, Submucous membrane; M, Fibrous tissue; SI, Slight inflammation.—Talbot.

published in book form with 73 illustrations in 1889, under the title of "Interstitial Gingivitis." Dr. Talbot's work is really the first comprehensive thing done upon this subject, up until that time, though Dr. Riggs

Figs. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, from Talbot, Znamensky and Smith, show that pyorrhea begins as a gingivitis and gradually penetrates to the cancellous bone.

in 1867 held a clinic in which he treated the teeth of Dr. Goodrich, whose teeth were loosened by a deposit of "salivary calculus and consequent loss of alveolar border." This was at a meeting of the Connecticut Valley Dental Society, held at Northampton, June 11, in 1867, which demonstrated the fact that Dr. Riggs comprehended in part the principles upon

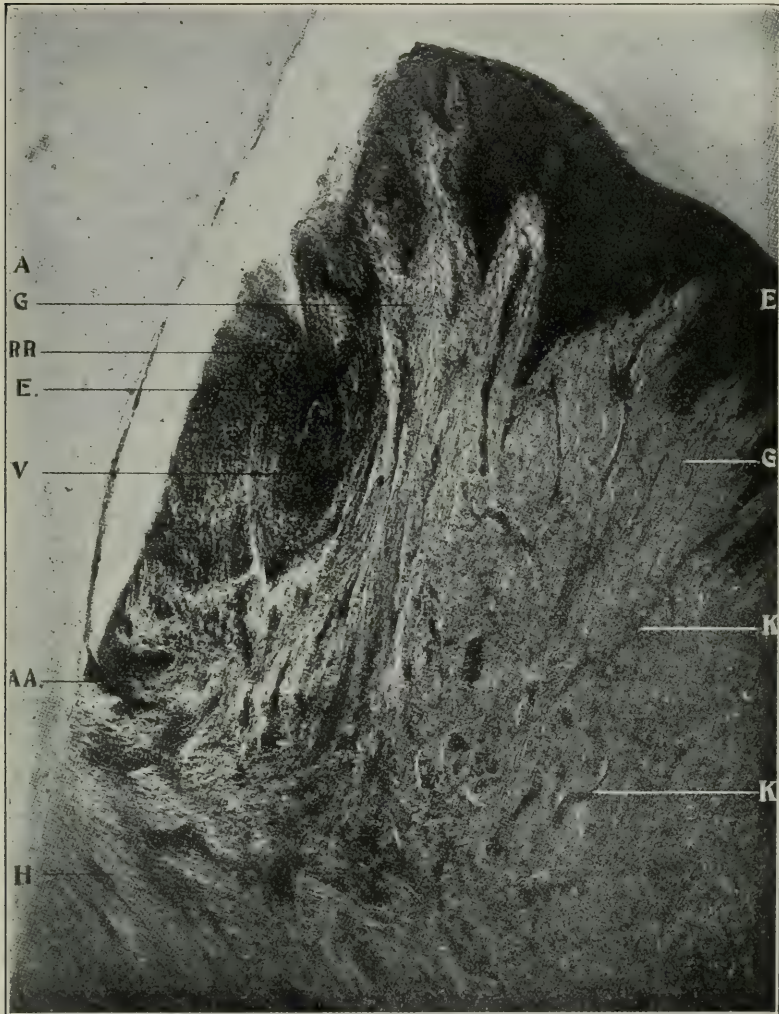


Fig. 2.—Longitudinal section of tooth and gum tissue. Chronic interstitial gingivitis. Dog. A, Enamel; E, Epithelial tissue; G, Submucous membrane; H, Periosteum; K, Capillaries; V, Violent inflammation; AA, Point of union of epithelial tissue and peridental membrane; RR, Space pocket from want of union of epithelial fold.—Talbot.

which the treatment of this disease has rested since that time until the present. The good results of his work were seen and noted by the members of the Connecticut Valley Society in a testimonial to Dr. Riggs two years later in the following resolution, which was adopted:

"Whereas, the credit for originality in surgery is always conceded to the one who first publicly announces a new operation, appliance, or method of treatment.

"Resolved, That, in the judgment of the Connecticut Valley Dental

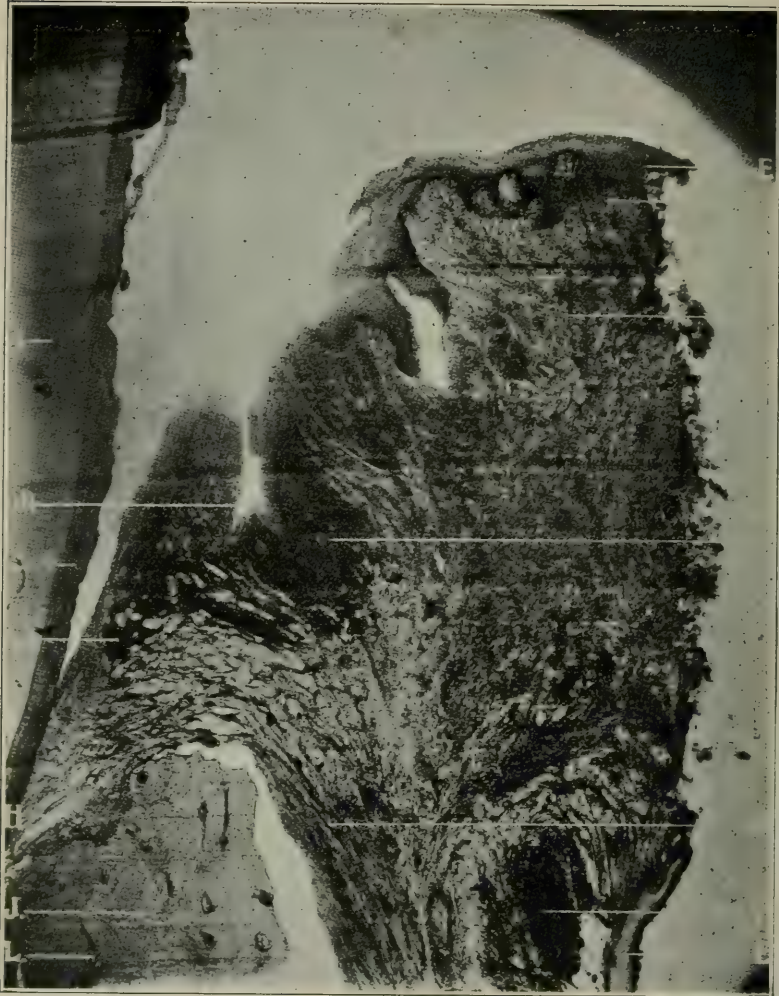


Fig. 3.—Longitudinal section of tooth, alveolar process and gingival border, showing active inflammation in scurvy in man. B, Dentine; C, Cementum; E, Epithelial tissue; G, Submucous membrane; H, Periosteum; J, Alveolar process; L, Haversian canals; M, Fibrous tissue; V, Violent inflammation; AA, Point of union of epithelial tissue and periodontal membrane; RR, Space pocket from want of union of the epithelial fold.—Talbot.

Society, the credit of originating and first publicly describing a new treatment for the cure of inflammation of the gums and absorption of the alveolar process, or the so-called 'scurvy of the gums,' thereby saving and restoring to comparative firmness the loosened teeth, is due to Dr. J. N. Riggs, of Hartford, Conn., he having detailed his method of

operating years ago to this Society, and illustrated it, at the request of the Society, by a clinic upon Dr. E. M. Goodrich, of Westfield, Mass., at our meeting at Northampton, in June, 1867. He also operated in Boston in August, 1866, with acknowledged success, upon Dr. D. K. Hitchcock.

"Resolved, That this resolution be forwarded to the journals for publication."

The teachings of Dr. Talbot regarding the etiology of this disease are essentially as follows: That the alveolar process is a transitory structure

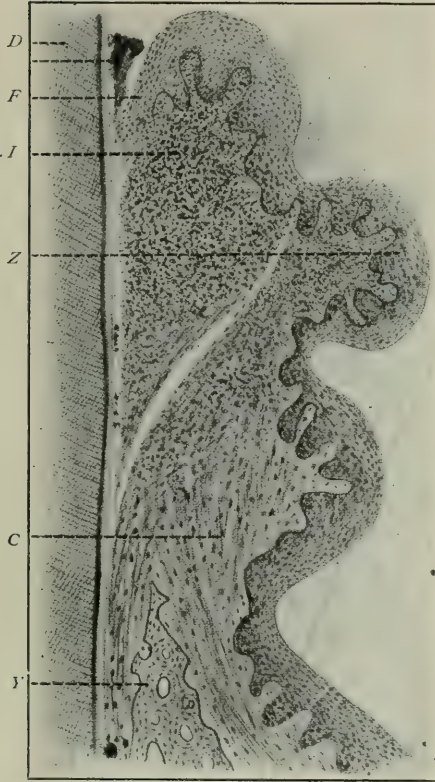


Fig. 4.—d, dentine of the tooth; p, tar-tar; i, papillary layer of gum; z, epithelial covering; l, infiltration of the gum with white blood corpuscles; c, healthy part of the gum; y, healthy bone. Magnified 80 times. —Znamensky.

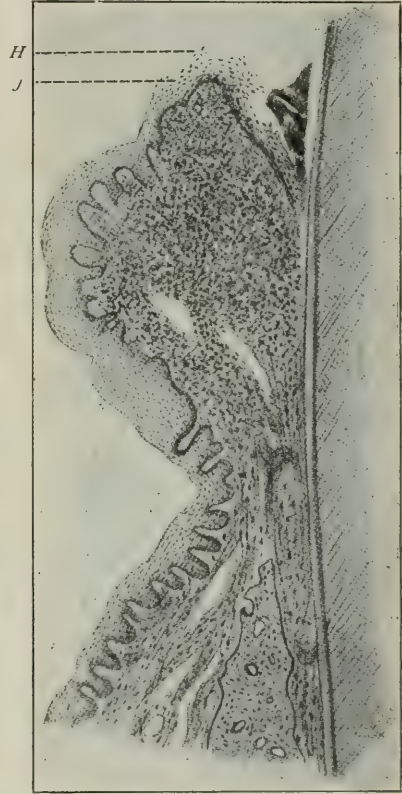


Fig. 5.—Shows the same parts at a further extension of the disease. The peeling off of the epithelial covering can be seen (h); a wounded surface is being formed (y). Magnified 80 times. —Znamensky.

and particularly subject to inflammatory disturbances. That its blood supply is that of an end-organ, by which he means to point the fact that no great arteries directly feed the tissues contiguous to the teeth, but on the contrary the blood supply comes through the capillary ends which supply these tissues, and is, on that account, more subject to blocking off of blood supply than are tissues that are supplied by larger arteries. Dr. Talbot

also teaches that by reason of the evolution constantly in progress in the human body that the jaws are slowly but surely lessening in size, and the alveolar process thinning in bulk and diminishing in blood supply; consequently the bony process falls a more easy prey to inflammatory disturbances than does the alveolar process of the races which were compelled to use their jaws and teeth more vigorously than the people of the present.

Dr. Talbot also has taught us that the etiological factors of this disease are both constitutional and local, that the constitutional causes are irritating substances absorbed from the bowels as well as retained waste materials due to faulty work by the eliminative organs of the individual. Dr. Talbot also teaches the necessity for eliminating local factors of irritation to the

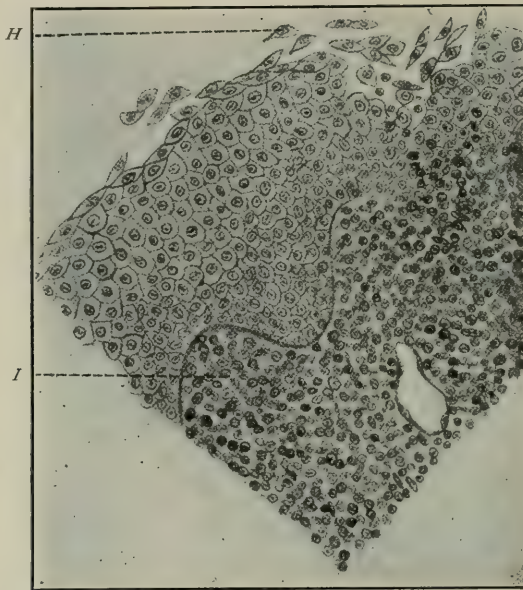


Fig. 6.—The peeling off of the epithelium; h, epithelial cells; i, deep infiltration of papillary layer of the gum with white blood corpuscles; the infiltration is penetrating between the epithelial cells. Magnified 360 times.—Znamensky.

gum margins. He shows conclusively in the illustrations of human and animal jaws which he has prepared, that the inflammatory process eventually involves the deeper portions of the alveolar bone as well as the margins, but attributes the ultimate changes which occur in the bones to irritants, though he does not definitely state just what these irritants are, he implies that they are of constitutional origin. The bone studies which he made to demonstrate the inflammatory process were, so far as I know, practically the first comprehensive work of the kind undertaken; and, while the deductions which he makes from the studies of these sections are not accepted by all men as correct, the fact remains that the work is extremely valuable even though it has not settled definitely the etiology of this disease.

Many dentists all over the world have recorded their opinions and beliefs regarding this disease; the next contribution worthy of note and careful study, with which the writer is acquainted, is that of Znamensky, of the University of Moscow, in an article on this subject, published in the *British Dental Journal* for October, 1902. In this article Prof. Znamensky shows a number of well prepared sections of the human jaw demonstrating inflammation of the alveolar process. Prof. Znamensky's conclusions regarding his work were essentially these, that the irritant leading to the bone destruction cause the lesions to begin in the gum margins, extending gradually to the alveolar bone. In this he differs from Dr. Talbot, drawing, as you see, a somewhat different set of conclusions from the studies

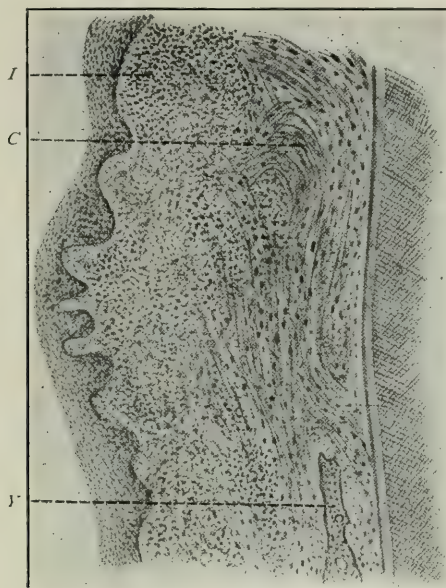


Fig. 7.—Shows that infiltration proceeds from the periphery, namely, from the gum into the depth, towards the bone and not reversely; i, infiltration of the gum; c, healthy part of the gum; g, healthy bone. Magnified 80 times.—Znamensky.

of the sections of the tissues undergoing disease which he presents for observation.

A later observer who has done most excellent work (A. Hopewell-Smith, of London), and whose observations and studies were presented to the reading public through the columns of the *Dental Cosmos*, under the caption "*Pyorrhea Alveolaris: Its Pathohistology*," says: "From his personal experiences of cases in which pyorrhea alveolaris was a prominent symptom, the writer is led to the conclusion that the morbid conditions of the jaws which produce the flowing of pus are not the etiological factors of severe metabolic disturbances of the alimentary tract or the vascular system,

but that they are *part and parcel* of them." A strong infection of the oral cavity by means of pathogenic micro-organisms may induce both an extensive pyorrhea in the pockets already deep enough to receive them, in all parts of the mouth, and contemporaneously a pernicious anemia or other lesion which reacts universally on the bodily tissues. Pyorrhea alveolaris does



Fig. 8.—Vertical section through canine and bone of right side of mandible of man aged thirty-nine. Pyorrhea not so marked as in previous case. Tissues over external aspect (x35). A, Dentin; B, Cementum; C, "Pocket" of gum, the edge of which is attached to the margin of cementum; D, Slight desquamation of oral epithelium; E, Slight inflammation of gum; F, Edge of alveolar bone transformed into osteoid tissue; bone lacunae and corpuscles indistinguishable; G, Hyperplastic periodontal membrane; blood vessels injected; H, Normal bone.—Smith.

not initiate, but is produced by the same septic cause which leads to general systemic affections, and may, among other diseases, set up pernicious anemia. He sums up the course of events in the following statement: "Atrophy of the bony socket and shrinkage is followed by a widening of the gingival margin and broadening and deepening of the pockets, with hyperplasia of the periodontal membrane. If a pathogenic infection occurs,

there is a lodgement of pyogenic bacteria in these already suitable pockets, and pyorrhea results, and it may or may not be accompanied by gingivitis and the production of tartar."

He states distinctly that the morbid conditions of the jaws that produce the flowing of pus are not the etiological factors of severe metabolic disturbances of the alimentary tract, but that they are part and parcel of them, which is a way of stating that the disease is constitutional. He also states



Fig. 9.—Gum tissue over external alveolar plate (x80). A, Slight depth of pocket; B, Gum tissue slightly inflamed; C, Cementum; D, Bone of external alveolar plate; E, Osteoclasts. —Smith.

that a strong infection may induce extensive pyorrhea and also pernicious anemia, and *makes the point* that pyorrhea does not *initiate*, but is *produced* by the same *septic cause* which leads to *general systemic infections*.

The work which Dr. Smith has done and the studies he has made of the sections of both healthy and diseased jaws has led him still a different set of conclusions from those of either Znamensky or Talbot, so

it would seem that there must be additional evidence gathered before we can agree as to the etiology of this condition.

Dr. Smith concludes his note by stating that at best, "treatment can only be palliative and unfortunately only directed to the prevention of further destruction; and not the *rehabilitation* or *reconstruction* of parts



Fig. 10.—No pus present. A, Free edge of cementum. Gum tissue adherent below.—Smith.

forever absolutely destroyed, and supports this statement by showing X-ray pictures which indicate clearly that the teeth there shown have practically lost all alveolar support." These splendid studies still leave us in the dark, and unfortunately leave the impression in the mind of the reader that the

treatment of pyorrhea is a comparatively useless and hopeless undertaking.

Talbot has not endeavored to differentiate pyorrheal inflammations into different types, but leaves the impression in the mind of the student that "they are part and parcel," to use the words of Smith, of "severe metabolic disturbances of the alimentary tract and vascular system,"

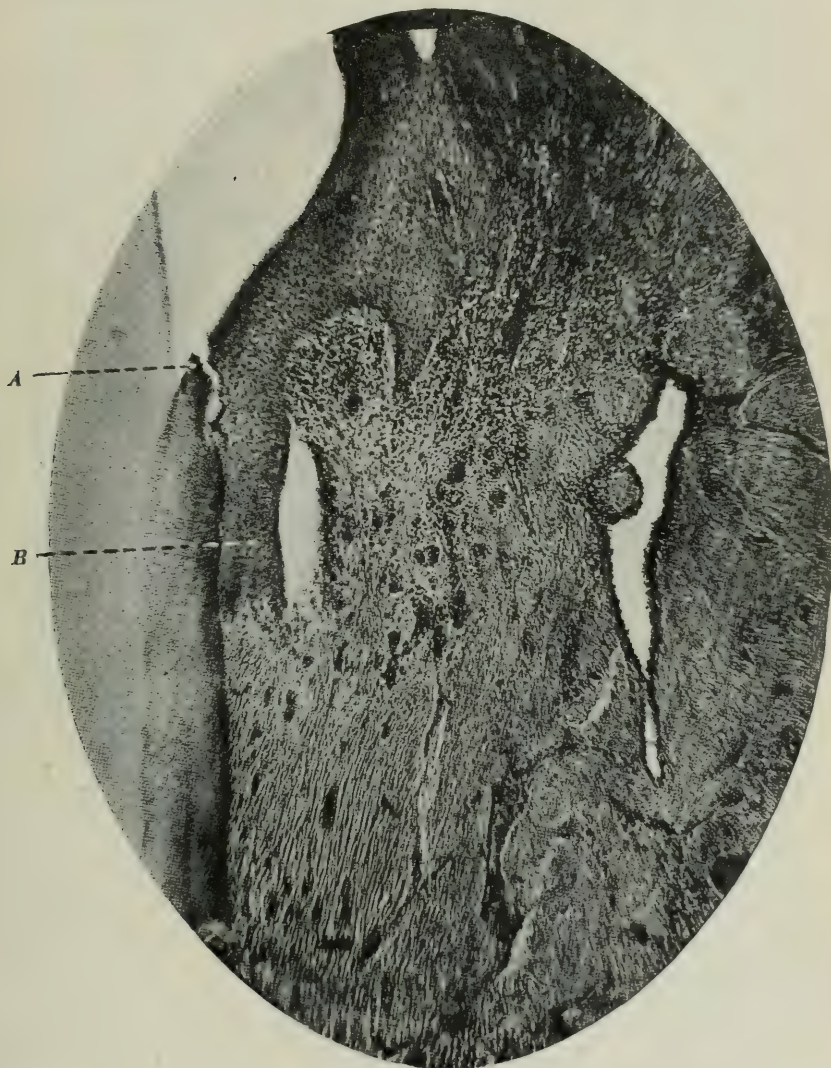


Fig. 11.—A, Free edge of cementum; B, Oral epithelium of gum tissue. Above A is a shallow pocket filled with pus during life.—Smith.

and if this were all of the truth it would discourage rather than encourage the average dentist in his effort to combat this disease. Neither of the three authors quoted have pointed out the relation which exists between the tooth's root surface and continued infection. This relationship was pointed

out by the author of this paper in an article read before the Northeastern Dental Association and published in the Dental Cosmos in 1911, in which

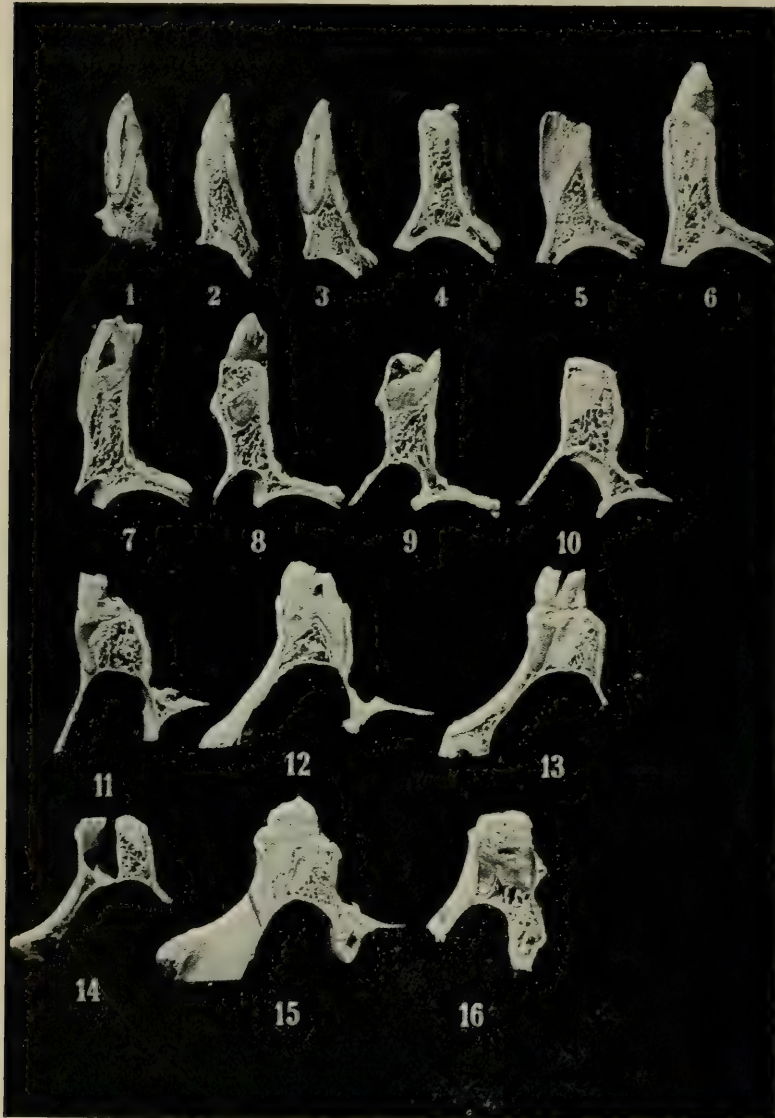


Fig. 12.—Vertical sections through the alveolar process of the maxilla. Left side, the facial external; right side, the palatal, internal surface; 1 to 4, incisors; 5 and 6, canine; 7 to 10, bicusps; 11 to 16, molars.—Fischer.

the pathology of the root surface was worked out. It was shown that the root surface, when once laid bare through resorptive processes, became a culture bed for many types of bacteria and that the leucocytes failed in

Figs. 12, 13 and 14, from Fischer and Cryer, show the cancellous nature of the bone of the jaws and its consequent ease of penetration.

their office, because the porous character of the root surface was of such a nature that it was impossible for the leucocytes to reach the bacteria in the pitted surface.

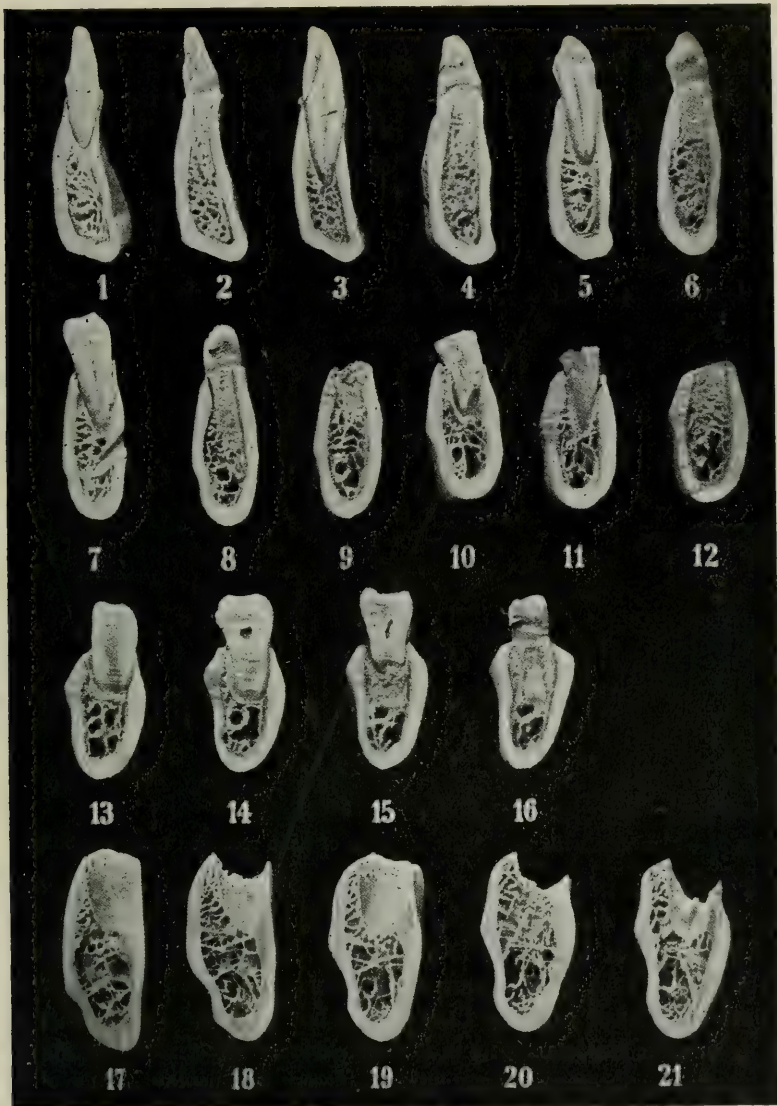


Fig 13.—Vertical sections through the alveolar process. Left side, the lingual internal of mandible; right side, the facial, external surface; 1 to 4, incisors and canines; 5 to 9, bicusps; 10 to 16, molars; 17 to 21, alveoli of molars from another skull.—Fischer.

The writer voiced the opinion, which is corroborated by many observers, that a gingivitis invariably preceded a pyorrheal inflammation. That such gingivitis need not be of bacterial origin. Inflammation of the tissues

contiguous to the thin edge of the process being entirely sufficient to stimulate resorption of the process margin. The factor which leads to the gingivitis might be of the *simplest character* and *soon have passed away*, leaving in its *train nothing to mark the fact* that an irritant had ever been present, as far as the *appearance of the tissues would show*.

Indeed, the fact that any bone had been lost could scarcely be appreciated except by the keenest search. Nevertheless, real damage has been done from which the patient is never destined to recover unless the pitted root surface thus far exposed to infection be surgically removed. Briefly, the reason for the foregoing statements is found in the porous nature of the root surface itself, and explains why many absolutely healthy individuals show resorption of bony process and the formation of deep pockets; individuals whose eliminative processes are seemingly perfect; the specific



Fig. 14.—Mandible with the cortical portion of bone removed from the body.

gravity of whose urine is normal, whose digestive processes are apparently perfect, but who show marked destruction of the alveolar margins.

The writer of this paper fully agrees with the view that destructive inflammations of the alveolar process are accentuated by irritants of constitutional origin; but certainly these constitutional factors do not play a greater or more important part in inflammations involving alveolar process and gums than these same constitutional factors would play in any other local inflammation. A study of the slides presented by Talbot, Smith and Znamensky all show the deepest inflammation nearest the gingivi, and the massing of leucocytes is progressively less as we recede from the gingival margins. This fact seems to have been given little weight by Talbot and Smith in their efforts to determine the point of origin, becoming deeply interested in the grave changes going on in the deeper structures of the advanced case.

I shall present for your inspection lantern slides from these authors which I shall ask you to observe for yourselves. The very porous cellular nature of the substances of the jaw makes it an easy prey for deep bacterial penetration and reasonably explains the presence of certain foci of inflammation found in the deeper tissues when considered in connection with the great injecting power of occlusion, and such bacterial invasion begins coincidentally with the destruction of the least bit of peridental membrane, so the steps are first gingivitis, which may be ever so mild and slight in character, resulting secondly in destruction of the delicate edge of the process. Such destruction denuding the pitted root surface, thus opening the door to continued infection. Once infection is admitted then superficial inflammation and subsequent deep-seated inflammation centered along the avenues of

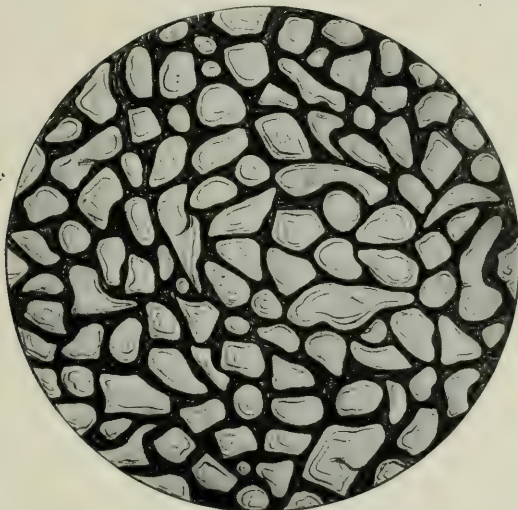


Fig. 15.—Area of root surface, showing its pitted character, the white areas being the stump holes of fibre ends. The dark areas show the more dense walls of the pits. Prepared for Dr. Hartzell by Dr. Carl R. Lemstrom.

least resistance in the bone becomes an accomplished fact. All the studies of bone inflammation presented prove this to be true, and the examination of the deeper structures for bacteria prove them to be present in every case examined by the author, and their presence explains the penetrating character of these inflammations. Why it is that so many observers have ignored, or overlooked, the bacterial holding power of the root surface and the powerful force of occlusion in spreading infection in relation to pyorrheal inflammation is a mystery to the author of this paper. The histological structure of the cementum seems to have entirely escaped the keen analysis which the dental profession gives to the other tissues involved in their sphere of action. A moment's review of the character of the root surface might be of value here. The cementum covering the surface of the root is composed of first

a layer, a typical bone full of branching bone cells which inhabit its lacunæ and canaliculi. As we approach the surface of the cementum it becomes more and more dense, fewer bone cells exist near the surface than in the deeper layers, until finally we reach a very thin, dense layer of cementum in which there are no lacunæ and through which very few canaliculi penetrate. This denser layer becomes in fact the foundation upon which nature builds the honeycomb-like surface which gives origin to periodontal membrane fibre. A picture of this surface made by Dr. Carl Lemstrom, of Minneapolis, for the writer is herewith submitted. Also, photo-micrographs of typical areas of cementum which show a number of lacunæ and canaliculi. This slide showing the pitted character of the root surface is, of course, highly magnified. The dark lines represent the honeycomb-like wall of the

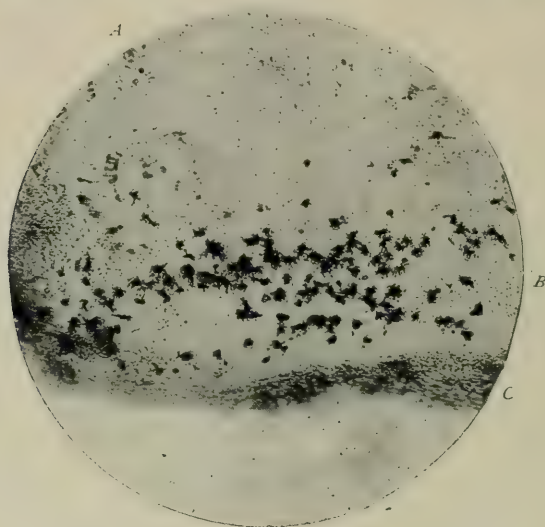


Fig. 16.—A, Surface correctly planed; B, Area of root too deeply planed; C, Area of root surface not treated.

pit, and the white area indicates the pit itself, in which the fibre ends are inserted.

While the profession has not taken the time to analyze the reasons for success or failure of the treatment of pyorrheal inflammation, it is a fact, nevertheless, that Riggs scored success in the treatment of this disease sixty years ago, and that here and there practitioners all over the country have scored successes in the treatment of this disease and have practically proved by their methods of treatment the truth of the statements made regarding histology of root surface, for most successful operators have been surgeons who have advocated and practised the removal of all deposit from root surfaces. Many advocate actually polishing the root surface and in so doing have removed the pitted layer. It is noted that those who have most perfectly attained that perfect condition of root surface which most nearly

approximates asepsis show the best results in treatment. Those who have cut too deeply in their effort to remove deposits show recurrent infections. The reason for this will be made quite evident from even a casual observation of the two slides showing pitted root surface and the lacunar structure of the underlying cementum.

A study of the slides of Talbot, Znamensky and Smith will give the careful student an excellent idea of the character of the inflammation we find in the alveolar process. The massing of the leucocytes is deepest, as was noted in an earlier paragraph, from the gingival margin toward the deeper structures, thinning out and showing less dense masses of leucocytes as we recede from the gingival margins with occasionally dense masses of leucocytes in the deeper structures, due, as I believe, to the presence of

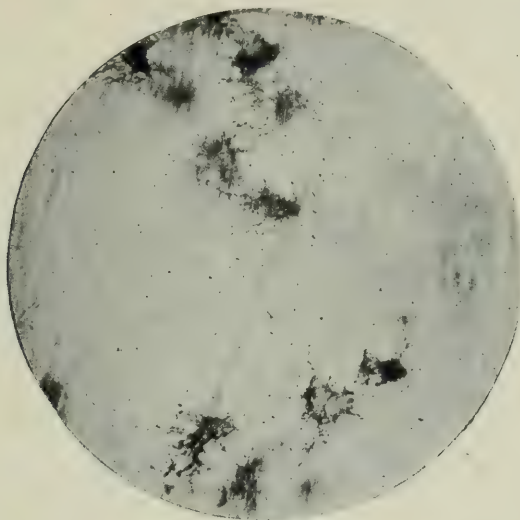


Fig. 17.—Bone cells exposed by too deep cutting of the root surface.

bacteria driven by the force of occlusion, which have followed the blood vessels and lodged in the natural cellular openings of the bone. We very seldom find areas of necrotic bone of any considerable size in pyorrhea. What we do find very frequently is carious bone. The bone is lost molecule by molecule rather than dying in masses. This fact is proved clinically in the experience of most operators and it coincides with the pathological pictures presented by the slides of the three pathologists quoted. The clinical evidences of bone inflammation in the gums also tend to prove the general statement that these inflammations involve the margins first and the deeper structures later. The thickening of the gum margins, which every observer who has studied these conditions from a clinical standpoint must have noted, indicate as a rule the depth to which the bone is vigorously involved;

though, of course, the overlying soft tissues do not always indicate occasional foci of inflammation found in the deeper portions of the alveolar process.

It will be interesting here to note a series of pictures presented in an article by Mr. J. F. Collier, showing the "progressive destruction of the teeth sockets," in the London Lancet, May 7, 1910, page 1261. Mr. Collier presents first a series of photographs of human and animal jaws which show markedly the progressive destruction of the bone from the alveolar margin toward the root apices and in one picture to which I shall



Fig. 18.—Casts and removable splint bridges and denture.

draw your attention there is a distinct evidence of condensing osteitis over the region of a cuspid co-incident in the same mouth with rarefying osteitis. Mr. Collier also presents a series of pictures showing cellulitis of the gum margins and radiographs of the teeth hidden by these same tumid gums. Mr. Collier's clinical description of his cases are classics and betoken the keen and analytical observer and will well repay anyone who will take the trouble to peruse them. In this connection I wish to again draw your attention for a moment to that one of Mr. Collier's pictures showing condensing osteitis as well as rarefying osteitis, and note in passing that while

comparatively seldom described is a more or less constant feature of pyorrheal inflammation. Having been noted by different observers and beautifully shown in the case of a human skull in the possession of Dr. Wm. Bebb, of the University of Southern California. I express the opinion that could we but find a method of so stimulating bone cells and periosteum after the surgical treatment of root surfaces has been accomplished, so that condensing osteitis would supervene, the problem of saving for years of usefulness many teeth now lost would be solved. I might say in passing that there are a number of men now working upon this problem, and it seems not unlikely that Dr. Dunlop, of Spokane, Wash., has hit upon a treatment which

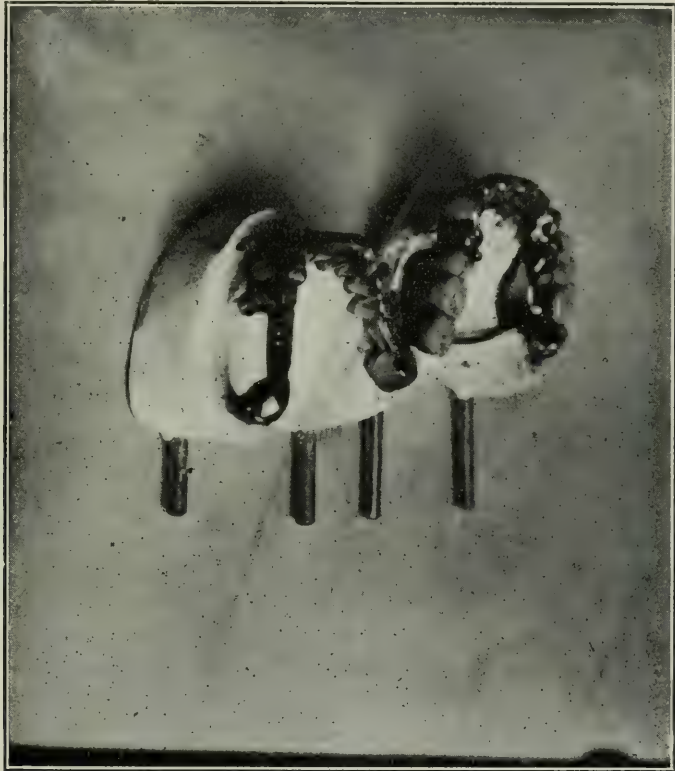


Fig. 19.—Splint bridges and denture in position.

wonderfully increases the vitality of bone cells. At the same time checking perforating canal absorption, which a study of the slides of Talbot and Smith demonstrate is a more or less constant feature of this disease.

Dr. Dunlop's treatment is now being tried out by a number of men who are specializing on oral infections and seems likely from the reports thus far made to become of great value and possibly a necessity to those who would attain the greatest meed of success in the treatment of this disease. That the bone can be rebuilt about the necks of the teeth is the

belief of every successful orthodontist, and Dr. M. H. Fletcher, of Cincinnati, Ohio, presented a specimen at the meeting of the Ohio State Dental Association at Columbus, O., in 1910, which showed new bone built around the neck of a broken molar root and extending over the broken end of the root and down into the pulp chamber. A picture of which specimen I herewith present. These statements regarding the rebuilding of bone I am well aware are heretical; particularly is this the belief of Dr. Smith, whose earlier statement you will recall was "that the treatment was at best palliative and only directed to the prevention of further destruction and not the rehabilitation or reconstruction of parts absolutely forever destroyed and not admitting of adoption of certain plastic measures which obtain at times in connection with other bones of the body." I am willing to admit that if the plastic measures referred to by Dr. Smith mean bone-grafting, thus far he is probably right, but that new bone is not built around



Fig. 20.—Removable cross-bar splint bridges.

the roots of teeth that have once undergone destructive inflammation is not an impossible thing, but on the contrary may become the rule and not the exception.

It is the experience of the author that teeth previously swinging in their sockets become rigid and that this degree of rigidity progressively increases. If these same teeth be held under a stiff splint for a sufficient period of time I note on the removal of such splint that teeth which one year before were exceedingly loose have become solid. It was recently my privilege to observe a case in the practice of my friend Dr. Logan, who will address you on that phase of the subject relating to diagnosis. In this case a lower central had rotated in the arch and moved forward and was exceedingly loose. Dr. Logan gave this tooth and the teeth adjoining it correct surgical treatment and moved the tooth by orthodontia appliances a considerable

distance in the arch, again aligning it with its fellows and completing the operation by placing upon the tooth a proper retaining splint which he allowed to remain the period of a year. He removed said splint in the presence of the writer of this article, April 27, 1912, when it was found that this tooth, which had previously been very loose, standing in a funnel-shaped depression in the bone, had become quite rigid and the tooth, to the casual observer, certainly did not suggest that it had ever been in the loose, unstable condition which cast and picture certainly prove it to have been before the treatment was undertaken.

The form of retaining splints and splint bridges in use by the author have duplicated this experience herein detailed many times. And a series of radiographs made before and after treatment, presented by Dr. Fletcher, of Cincinnati, all bear cumulative evidence that new bone is under certain conditions deposited about the roots of teeth which have lost previously existing alveolar process. A type of removable splint bridge in common use in the practice of the author will be shown upon the screen.

Pyorrhea alveolaris begins in the gum margins. Perhaps no more conclusive argument can be adduced on this point than the fact which every dentist has noticed, that the removal of infected teeth results 99 times out of 100 in cessation of all inflammatory symptoms. The second corroborative fact is, that removal of the infected porous root surface usually checks all types of interstitial gingivitis precipitately, if the work be accurately done. In the observation of 1,000 cases the author has found no exception to this general rule, except in cases of acute diffuse nephritis, diabetes melitis and certain types of drug poisoning. Barring these conditions, no matter whether the case be one in which the marginal inflammation was induced by an accumulation of salivary calculus above the gum margin which causes the loss of not only alveolar process, but overlying soft tissues as well, or the impaction of food and its decomposition between the teeth, or badly fitted crowns, mal-occlusion, acute febrile diseases of childhood, or rough, ragged enamel margins or any other mechanical, traumatic or chemical stimulant locally applied. The result is the same, namely: cessation of inflammatory symptoms and a return to normal color of overlying soft tissues providing the root is "skinned." If, on the contrary, any considerable number of the various types of gingival inflammation and osteitis found in this locality resists this treatment, one would reasonably be justified in concluding that constitutional causes were largely responsible for the presence of such inflammations and the opsonic index has been greatly reduced by the constant absorption of bacterial leucomaines. When one commonly and constantly sees marked and brilliant results flow from simple surgical treatment of the root surface in a constantly increasing list of recorded cases one is absolutely compelled to give such statistics credence.

Talbot shows conclusively (page 82, Interstitial Gingivitis), "that

calcic deposits on the roots of teeth [below the gum margins] are a result of inflammation and pus infection, and not the cause." Calcic deposits from saliva above the gum margins, on the contrary, the author believes to be a common cause, if not the most common cause, of inflammation of the gum margin. It is quite immaterial to me whether you designate the condition arising from calcic deposits above the gum margin as "salivary calcific pericemental alveolitis," according to Prof. Logan, or whether you call it *pyorrhea alveolaris* or *interstitial gingivitis* or Riggs' disease, the net result is the same, namely, loss of bone, loss of teeth, and the initiating factor is a local irritant of some sort or other.

The continuing factor which perpetuates the inflammation while you sleep is mixed bacterial infection. Right here I wish my readers would drive a spike, for there has been many discussions on this point, and if the thought has not occurred to you before, now that this fact is brought to mind, its force should become apparent. Of course, in the saving of teeth an inflammation induced by salivary deposits with a consequent sinking of gum and peridental membrane and bone may not show a marked pus infection and is certainly less difficult to treat than an inflammation which has drilled the alveolar process full of holes, and become richly infected, but just the same the patient will eventually lose his teeth unless this condition is corrected and the deposit of calculus checked, and lest I forget it I wish to state that since listening to Dr. Black's recent contribution to our literature showing that over-feeding and hypernutrition is the cause of salivary deposits, the author has experienced the satisfaction of noting the cessation of salivary calculus deposits in the mouths of five patients who were induced to markedly decrease their daily food supply and with the added benefit of increased vigor as a direct result of such curtailment of food, which resulted in more perfect assimilation of the lessened portion.

THE PART WHICH BACTERIAL INFECTION PLAYS IN BONE INFLAMMATION.

The great amount of work which has been done in an effort to discover specific micro-organisms for various diseases has gradually brought to light certain basal facts in regard to micro-organisms, which it would be well to note in discussing the relationship which they bear to *pyorrhea*. First of all, it has been found that certain micro-organisms have resisted growth on artificial media for considerable periods of time. Some organisms refusing growth on artificial media entirely, others refusing to grow on artificial media when separated from certain other micro-organisms found growing with them. On the other hand, growing freely in mixed cultures, and it is the experience of all workers in the field of bacteriology that it is a rare thing indeed to find pure cultures of any form of bacterial growth.

Dr. A. F. Schafer, of Bakersfield, Cal., is of the belief that all infections are "mixed infections," that except in rare instances there is no

such thing as an infection by a single species of micro-organism; that while one species may predominate, the pathogenic process engendered by it is accelerated and intensified by the complicating presence of other organisms of other species; in other words, that in the course of an infectious disease the symptoms are due not only to the effects of a single species of organism (the specific infection), but to the influence of other organisms whose pathologic role is not insignificant, but which must be reckoned with in any successful scheme of therapeutics.

Dr. Schafer further believes that the human subject is at all times the host of a great variety of organisms and harbors these pathogenic bacteria without harm to itself during periods of physiological resistance, at par, and in the absence of any solution of tissue continuity. When the resistance is below par, or a solution of continuity of tissue occurs, the bacteria harbored by the human host assume pathological significance.

Furthermore, he contends that certain diseases, as typhoid fever, pneumonia, tuberculosis, erysipelas, rheumatism, and others, are objective and subjective symptomatic manifestations of the preponderance in the patient of the toxic and destructive products of the peculiar species of organism to which the etiology of the disease is usually ascribed, as *B. typhosus* in typhoid fever, *B. pneumoniae* in pneumonia, the *B. tuberculosis* in tuberculosis, etc., and, in addition, the symptoms are due in part at least to the destructive action of certain materials produced by complicating organisms which are always present in great variety and number.

As an illustration, attention may be directed to the now commonly accepted idea that in pulmonary tuberculosis the great danger to the patient, the difficulty of the treatment, and many of the most notable symptoms, such as loss of weight, high temperature, disturbance of circulation, purulent expectoration, destruction of tissue, etc., *are due to the complicating organisms*, and if the so-called mixed infection can be checked or eliminated, efforts may be directed against the bacillus tuberculosis with far greater success than has heretofore been possible in the treatment of this condition.

Dr. Schafer points to the fact that the administration of bacterial vaccines to patients suffering from infection not infrequently fails of effect because the truth of the above assumption is not recognized, especially when the treatment, being based upon the opsonic theory, consists in the use of a vaccine made from a single species of organism isolated from the patient. Bacterial vaccines made from a single species of organism prove successful in many cases, but the multiplicity of "combined" bacterial vaccines now in use points to the rapidly developing conclusion that the great majority of patients require something more than treatment with a vaccine made from one organism; the success attending the use of bacterial vaccines made from a number of different species, even when used in cases apparently due to one species, points to the likelihood of this theory being correct.

The fact that certain pathogenic micro-organisms can be harbored in the tissues for considerable periods of time without harm to the body, is due to two facts, the first and perhaps most important one is, that the blood serum has a certain normal resistance, an overcoming power which is inimical to their growth. This material has been called an opsonin. Wright and Douglas, of London, demonstrated in 1903 "that the blood serum contained substances which acted upon the bacteria, making them attractive food for the white blood corpuscles, and this substance they called 'opsonin,' from the Latin *opsonare*, meaning to cater, or prepare food for;" and Wright developed a technic by which he could determine the amount of opsonins present in the blood serum of any human being as compared with any other human being. I do not intend to go into the technic or methods of determining opsonic index, but I do wish to draw your attention to the fact that this anti-body in blood serum is the most vital characteristic in animal resistance to bacterial invasion, that if the creative power of the individual for the development of opsonins is minus then the individual becomes an easy prey to infection. Just so long as resistance is plus, by that measure of time the individual is immune or unaffected by bacterial presence. The second fact to which I wish to draw your attention regarding immunity to bacterial infection in this connection is the physical need for particular forms of food demanded by one micro-organism which, if not found in the tissue, obliges such micro-organism to exist quiescent or harmless. Perhaps the particular element lacking for the rapid growth of such organisms depends upon the presence of another organism which, being planted in conjunction with the first, provides the necessary element for the growth of the second, and it then becomes virile and active, producing characteristic symptoms which are referred to it by observers without noting the fact that it is dependent for its pathogenicity upon what may be under all circumstances an absolutely harmless individual. This seems to be the case with the spirillum of Vincinti. Duval found it to be true of leprosy and indeed did not make a success of the growth of the lepro-bacillus until he utilized a suggestion made by Prof. Gustav Mann that the missing substances demanded by the lepro-bacillus be provided in the form of an amido acid which, on being supplied in the culture media, resulted in rapid growth of the lepro-bacillus. Therefore, it seems likely that bacterial growths which we find in pyorrhea pockets depend vitally on the presence of two or more micro-organisms. These are not at all new ideas, although they are sometimes lost sight of by those enthusiasts who are in search of a specific micro-organism. The principle was noted by Pasteur, that greatest of all bacteriologists.

Dr. Timothy O'Leary, of Tufts College, of Boston, in an article published in the Dental Cosmos, January, 1910, voices the opinion "that the fusiform bacillus so constantly found in pyorrheal pus is to be looked upon as the essential infective agent," and we all know it has resisted

growth in pure culture, and thus far I have found it absolutely impossible to make a vaccine of this organism, or even to obtain it in a sufficiently pure state to estimate opsonic index of the individual to it in whose tissues it has been plentifully found. It is not unlikely, therefore, that the fusiform bacillus may be, as O'Leary believes, the specific organism of pyorrhea, though Goadby found that in many of his cases the opsonic index was usually low to staphylococcus and the pneumococcus, and this was also the experience of Madalia, who reports 32 cases treated by vaccines made from these organisms with marked benefit.

Prof. Znamensky, describing his method of treatment, based upon the pathological conclusions from his studies, which were, in brief, that the disease was one which commenced in the gum margins and progressed toward the bone, adopted a method of treatment which consisted in scraping out the bone around the necks of the teeth. At the time his article was written he had 742 cases with 2,415 scraped-out sockets which had been affected with purulent discharge, and says that the scraping out of the affected bone of the socket and the gingival sac is the only rational means for radical and rapid treatment, and he adopted local anesthesia to make it possible to do this operation painlessly, and owing to the painlessness of the operation he had a better opportunity to remove the tartar so cleanly that afterwards it was unnecessary to inject acids to dissolve out any of the remaining particles of tartar.

I wish you to note here that Znamensky, in explaining his great success in the treatment of his cases by curetage of the alveolar margins makes it plain that he deals very carefully with the root surfaces, and I believe that it is probable that the greatest benefit of his treatment is derived from the perfection with which he removes the dead putrescent surface of the root exposed in the pockets at the same time and by the same method that he accomplished the removal of the tartar.

I bring this point out because in the treatment of my own cases, while scrupulously removing any carious bone found in the bottoms of the pockets I have found it unnecessary in the great majority of cases to scrape or curette the alveolar margins and find that the accurate skinning of the root surface induces rapid healing and cessation of pus flow without the sacrifice of additional bone.

The methods of Znamensky, while successful, require the copious use of local anesthetics and necessitate the removal of much bone upon which the continued usefulness of the tooth absolutely depends. Znamensky dwells not at all on the bacterial holding power of the root surface, and while believing the disease in a great majority of cases to be local in character, gives comparatively little heed to the penetrating power of the bacteria themselves, nor does he mention power of mastication to drive the bacteria in the pockets into the vascular channel.

A careful student of pathology in general must inevitably arrive at the

conclusion that the great majority of pathological lesions are due to the introduction of living bacterial organisms into the tissues. The great diseases with which we are becoming more and more familiar are found to be dependent upon inoculation. The work of Pasteur, of Koch, of Metchnikof, of Wright, of Douglas, of Klebbs, of Loeffler, of Erlich, of Alfred Mantel and Goadby, Besson, and many, many others tend to create in our minds the belief that all the important diseases depend upon direct inoculation into the tissues of living organisms which are either specific or mixed infections. Therefore, the first great logical conclusion regarding this disease should be *shut out infection*. First, for the specific reasons that we wish to save our teeth, and second, because any door of entry held constantly open for the introduction of living organisms into the circulation must be an enormous menace to the life of the individual. If we wish to plant tetanus we must have a door of entry, a break in the skin or mucous membrane. If we wish to plant tuberculosis we must have a door of entry. If we wish to plant yellow fever, if we wish to plant diphtheria, if we wish to plant rheumatism, a point of inoculation must be provided. The penetrating character of all these types of bacteria, causative of these various diseases, is well known, and the greatest danger is a break in the skin or mucous membrane. We devote untiring vigilance to the exclusion of organisms from accidental wounds, and our greatest surgeons give their closest attention and best thought to this matter. We ventilate our buildings with washed and strained air. We inveigh against spitting in the streets to prevent the lungs from picking up bacterial infections. Lungs guarded by tracheal mucous membrane armed with mucous glands to wash off, and cilia to whip out micro-organisms. We carefully scrutinize our food, for fear we may pick up harmful organisms in that food which may gain an entry through some trifling break in the mucous membrane of the alimentary tract, and at the same time overlook, to a great extent at least, the largest door of entry for the inoculation of harmful infections—a door of entry cunningly hidden from the eye—and for that reason doubly dangerous.

The root surface when once infected never ceases to be a culture bed until the tooth is finally extracted, or until that root surface is robbed of its bacterial holding power. While the leucocytes of the body can and do engulf and assimilate millions of bacteria for a considerable period of time calls forth opsonins in opposition to the harmful bacterial leucomaines. The leucocytes in time tire and the creation of opsonins after a time grows fainter. Goadby aptly states this fact, "that small but considerable dosage with bacteria and their products from a local focus tends to gradually break down immunity" (Page 109, London Practitioner, Jan., 1912). He states further in the same article, "that of many mouth infections an

exceedingly small local cause may produce suddenly generalized and widespread infection without apparent exacerbation of the mouth disease preceding such infection."

In stating this truth regarding infections, Goadby is discussing arthritis deformans in relation to mouth infections. If the general surgeon knew that in most of the cases upon which he operated there existed in direct contact with bleeding vessels a dead surface loaded with a bacteria, varying in extent from a quarter of an inch to five square inches he would be horrified and would probably recommend the wholesale extraction of teeth. But such is actually the case. Great prominence has been given the crypts of the tonsil as culture beds and points of inoculation for bacterial infection, and indeed the tonsil is frequently a point of entry for many types of infection. Alfred Mantel first pointed out the relationship of the tonsil as a point of entry to rheumatoid infection in 1887.

Dr. Frank Billings, of Chicago, in the *Illinois Medical Journal* for March, 1912, cites ten cases of multiple arthritis which were produced by streptococcic infection of tonsils, pure cultures of streptococcus were obtained in these cases, which became free of joint disturbances upon enucleation of the tonsils. He also reports a case of arthritis deformans due to pyorrhea, and it is undoubtedly true that the tonsil is frequently a point of inoculation for streptococci. He also reports subacute and chronic parenchymatous nephritis due to the same streptococcus which he finds in the tonsil, and the great majority of the medical profession seem to believe that the tonsil is a place to admit systemic infections and advise tonsilectomy and practice it with great success, but nevertheless few individuals suffer tonsil infections as compared to the vast number of individuals who suffer the same character of infections from pyorrhea pockets. In the first place the tonsil is normally lined with columnar epithelium. The pyorrhea pocket is not so protected, but, on the contrary, contains a dirty root surface heavily infected, constantly in contact with bleeding and broken blood vessels. Hence, much more likely to introduce microorganisms into the general circulation than is the tonsil. It is more likely to do this because the tooth itself must act as a hypodermic syringe plunger. With every movement of occlusion, the teeth, bearing, as they do, according to Prof. Black, hundreds of pounds per day of pressure, must, on occlusion, drive out into the circulation with each closure of the jaws the bacteria which multiply in the pyorrhea pockets, forcing these bacteria to scatter through the body of the jaw and enter the lymphatics as well as gain direct access to the blood stream. This explains the foci of inflammation found scattered through the body of the bone in the studies of Talbot, Smith and Znamensky, and it also explains the great prevalence of tubercular glands in children. The writer of this article has three cases of septic endocarditis upon record traced directly to infection by way of pyorrhea pockets.

I also wish to report a typical case of pyorrhea alveolaris, patient aged 50, male. Molar and bicuspid in both lower and upper arches being freely movable in sockets, having lost the bone to about one-half of the original depth of the sockets, pus discharging freely from the sockets about the teeth, temperature normal, specific gravity of urine 1018, no albumen, no sugar. Patient reports a tender area in the stomach wall. Diagnosis, ulcer of the stomach accompanied by chronic dyspepsia. Patient has had treatment for ulcer of the stomach for two years with but temporary benefit. The treatment in this case was first extraction of two of the loose teeth, followed by accurate planing of the root surfaces of all the teeth which had lost alveolar process. Absolute cessation of pus-flow. Gums resume normal tint, and after two months no tenderness in the region of the ulcer; digestion about normal.

Case 2. Male, aged 48, chronic pain and tenderness in the masseter muscles of left side. Tenderness of the sub-lingual glands and tortocollis. Tenderness of the left shoulder joint. Examination of the mouth revealed dead pulp in left lower 8 with free pus discharge from deep pyorrhea pockets. Left lower 8 and 7, vital pyorrhea pockets one-third of the pockets. Left lower 8 and 7, vital, and pyorrhea pockets one-third of the on both sides of the mouth. Chronic acid indigestion with constant eruction of gas after the ingestion of food. Treatment, extraction of loose left lower 8. Planing of the root surface of all the teeth affected by pyorrhea. Pockets were pencilled with tincture of iodine. After two weeks rheumatic pains in shoulder and tenderness of sub-lingual glands disappeared. Digestion improved. End of the fourth week, all inflammatory symptoms contiguous to the teeth absent. Teeth no longer tender on occlusion. Patient has resumed vigorous mastication of food. End of two months, all symptoms of dyspepsia absent. This case No. 2 is typical of a group of five cases in which joint involvements have been present from one to three years which have all disappeared upon the stamping out of oral infections. In this connection I draw your attention to the report of three cases of severe mouth infection accompanied by arthritis deformans reported by Goadby in the London Practitioner for January, 1912, which cases were clearly traceable to mouth infections and yielded to local treatment, reinforced by vaccines made from organisms isolated from the gum infections.

Goadby was able to produce well-marked joint inflammations in animals by inoculating them with living organisms obtained from the mouths of these patients. I draw your attention to these cases to accentuate the fact that bacterial infections can and do occur through the medium of pyorrhea pockets that such infections may involve any tissue in the body dependant upon the character of the infection. The bacteria found in the human mouth and alimentary tract depend upon habitat, occupation, foods

and internal resistances of the individual. In the matter of foods, Metchnikof has proved conclusively that those individuals who live largely upon buttermilk or clabbered milk replace the putrefactive bacteria in the bowel with the lactic acid bacillus, clearly to the benefit of the host, and all will admit that the individual who habitually cleanses carefully his teeth and oral surfaces will have fewer and less varied forms of bacterial growth than the individual with the habitual dirty mouth. The vast importance of oral infections to the general welfare of the body was never better illustrated than by that series of cases reported by Dr. Henry S. Upson, Professor of Neurology in the Western Reserve Medical School, in the *Dental Cosmos* for May, 1910, in which he shows conclusively nine cases of insanity due to painless dental disease. Of these nine cases operated upon dentally, six have recovered, two are improved, and one remains unimproved. The accumulation of well authenticated records of this sort certainly must increase the importance of dental disease in its relation to the welfare of the human body. Not only do they find dental lesions operating to bring about the loss of the teeth themselves, but we find that these lesions open a door to infections which may cause pernicious anemia, septicemia, rheumatism, neurasthenia, severe forms of dyspepsia, and acute insanity, tuberculosis, actinomycosis, hominous and nephritis." There is not the slightest doubt in the mind of the author that pneumonia is a mouth-planted disease. The absolute necessity for a point of inoculation for all germ infection and the constant presence of lesions under the gum margins, thus providing a door of entry for these infections, should re-awaken the interest of every dentist and physician to the necessity for preventing such lesions and a sense of responsibility to see that such lesions, once incurred, are speedily healed. This is easily possible. The recognition on the part of the dentist of the necessity for surgical interference in all cases of alveolar inflammation should rest on one specific fact, namely, that wherever alveolar process has been lost, exposing broken vessel ends and pitted root surface to infection, treatment is indicated, and that treatment should consist of first, the elimination of every possible form of local irritation, scrupulous cleanliness of the necks of the teeth maintained by daily care on the part of the individual, and the planing of the root surface wherever fibre-bearing surface has been exposed. The removal by the curette or bur of any dead bone recognized in the alveolar process and the free use of iodine pencilled into the pockets to destroy as many as possible of the bacteria which could not be removed surgically. These measures should be reinforced by careful attention to diet and the avenues of elimination. Flush the blood stream by generous drinking of water. This will increase the activity of the skin and alimentary tract and help to maintain that nicely-adjusted balance between waste and repair.

THE PRESIDENT called for discussion of Dr. Hartzell's paper.

DISCUSSION ON DR. HARTZELL'S ADDRESS.

DR. GARVIN: Mr. Chairman and gentlemen: I wanted to say, as this is the only opportunity I have had, that coming from the West I am particularly pleased to be here at this time, not only because I am always pleased to attend a meeting of this society, but because at this time the details were planned and carried to a successful conclusion by the Hamilton Dental Society, and I always look upon Hamilton as my home. It was here I first commenced to study dentistry, and from here I went West, where I had the great good fortune not very long ago to meet the writer of this charming paper. It has been a great pleasure to me to meet Dr. Hartzell, who I look upon as a typical Westerner. Dr. Hartzell has that enthusiasm and optimism and initiative that makes for success, and, as you already know, he knows how to shake hands. You feel at the back of that hand-shake there is a man. He is a thorough student of human nature. I might tell you a good deal of his office. Everything new that is worth while you will find there, even to a Burroughes adding machine, by which means his assistant can get an accurate statement of the accounts each night, each month, and each year. In fact I would very much rather talk on Dr. Hartzell than I would on his paper. I would say at the very outset when expressing my thoughts, as a gentleman said in Winnipeg a few months ago when he was speaking there, I want it clearly understood that everything I say is of this day and date only. I feel when discussing this very technical and scientific and instructive paper that my opinion in regard to these matters is not mature, but I will express my ideas as they are at present. I was pleased in the first instance to note that the essayist claimed the percentage of cases that the average practitioner could cure was 80 per cent. I take it that he and other specialists can do much better than that, but that he does not pretend to cure every case, which makes the situation appear more hopeful to most of us. As to the etiology of pyorrhea I also agree with the essayist, that the true cause is due to local conditions and not to constitutional conditions. I agree with this view also, that constitutional factors play no more important part in this local inflammation of pyorrhea than it does in any other local inflammation. I am convinced of this because it is well known that to cure disease we must remove the cause. Personally I have cured many cases of pyorrhea, typical cases, with local treatment alone, and I feel that if the cause was due to constitutional disorders that that would hardly be possible. In regard to the local causes, we have deposits sometimes, such as a wooden toothpick being wedged in between the teeth, producing an inflammation which finally results in pyorrheal pockets, or we may have something that grows in between the teeth and sets up inflammation, such as overhanging fillings and crowns, the application of arsenic and other poisonous drugs, non-occlusion, and, as also included in the paper, mechanical appliances, chemical stimulants, and so on. There was one thing given as a local cause

which, I think, should be particularly emphasized at this time, and that is mal-occlusion. I think a great deal of the failure in the treatment of this disorder comes from mal-occlusion of the teeth. Also in some cases we have as a result of this what is well known as the periodental aspect, which personally I look upon as a pyorrheal alveolaris. From that standpoint I would have to take exception to the view that in pyorrheal alveolaris we invariably have gingivitis first. I think we do have the deep-seated conditions without the trouble at the gum margin which was described in the paper. Only a day or two before leaving the West a patient was referred to me in which I found a rather unusual condition. The anterior teeth were apparently in perfect condition, the gums showing no trace of pyorrheal infection in any way, while around the molars on the right side, upper and lower, there were small pockets. On the left side on the distal of the lower second molar was a very deep pyorrheal pocket with a discharge, the pocket reaching almost to the apex on the left side. Indeed there was a considerable discharge which I diagnosed as pyorrheal pus. The gum margin seemed to be in a fairly healthy condition. My diagnosis may be wrong, but I feel there are these deep-seated troubles in which we do not have gingivitis, which the essayist claims is always present in that condition. In regard to cutting too deeply into the root surfaces, and, as a result of that, having a recurrent infection due to the opening of exposure of the bone cells, I think, in considering this carefully, that this, from a scientific point, was most interesting, and a point that is well worth thinking over seriously, but at the same time I feel in my own practice that my failures were not due to that cause. When I start to treat a pyorrheal pocket that pocket is thoroughly scaled, and I do a little more than that, really following out Dr. Hartzell's instructions in an address I heard given in Minneapolis several years ago, in which he said it was necessary to remove a little more than the actual deposit off that root, that the outer covering of cementum should be planed off, removing the dead fibre. I believe that the outer surface of the bone should be planed off, and for that reason I try to scale each part thoroughly. Now, I believe if I have done that thoroughly, at the next sitting there should be no pus discharge from that part. That is in the average case, in cases that I feel that I can cure, and if there is any pus discharge I scale that pocket again and usually find some little point that I have overlooked for some reason at the previous sitting. In cases where we do have recurring infection I believe there are a number of causes for that, but I am not prepared to accept that explanation as final. I do not know that the essayist meant that we should accept it as the only means, and I think credit is certainly due him. He is the first man I have heard of to mention that fact. It may be possible in planing these roots off and going at it very vigorously to plane too deeply, but personally I have not felt that I have had that trouble. In regard to Dr. Dunlop and his method of treating this disease, I know Dr. Dunlop

has gone into it very thoroughly, and I am sure if you go into it a little more fully you will be interested. As to the formation of new bone following the treatment of pyorrhea, personally I have not seen a case where that has taken place. There is a case quoted from Dr. Logan's practice in which this has taken place, but the conditions are unusual. This tooth had been previously moved by orthodontia and complicated by a different environment. We all know that a tooth moved with an appliance in that way that the bone is absorbed on one side of that root and re-formed on the other. I am inclined to think in that particular case that the movement of that tooth was a decided advantage to it, that it was moved into an area where it was quite easy for bone to be formed around that root, and I think much might be done along that line in conjunction with the orthodontist in treating cases of that kind. I think the environment could be improved in some cases by correcting the irregularity at the same time, and then putting on a splint. I would explain the tightening of the teeth as a result of a splint in this way, that new bone is formed, or that the bone becomes denser in that portion of the alveolar process; that is in contact with the root surface, but not on that surface of the root which was planed off and which previously was in a caries condition. I think the movement of the teeth previous to putting on the splint would cause a certain amount of absorption of the bone adjacent to the tooth, and when this tooth was held solid in position it would be an easy matter for that bone to become denser and new bone to form in that part. I have not seen a case where it has formed in the pocket itself. I would be very glad to believe that that was possible, and further, I see no reason why, with improved methods, it should not be attained. Personally I have not seen a case where I really thought that had taken place. In regard to the part that bacterial infection plays on this bone formation, I do not wish to take issue with the excellent way in which the essayist has handled that part of the subject. I certainly agree with that quotation from Dr. Goadby's paper in which he says a small or considerable discharge of bacteria and other products from a local focus tends to gradually break down immunity. Personally I have no doubt pyorrhea produces in some cases pernicious anemia and many other constitutional disorders, and we are reminded if a man with a healthy mouth is never sick, a sick man never has a healthy mouth. There was a case quoted in that paper which Dr. Hartzell mentioned on page 108*, which describes it, and I think it would be interesting to read that, as many of you will not perhaps have access to that journal: "A typical case may perhaps emphasize the point more clearly. A girl aged 21 was attacked somewhat suddenly by swelling of the hands and feet, and fever lasting two or three weeks. With the subsidence of the fever the joints did not return to their normal state, but remained painful and stiff; walking was almost impossible. The affection was bi-lateral and the swelling was evidently peri-articular, and

*London Practitioner.

to a limited extent affected the synovia of the joints, but no fluid was discoverable. Treatment at Bath and a long course of salicylates, produced little improvement. There was no family history of rheumatism or of gonorrheal infection, and no septic focus was thought to exist. On examining the mouth the right upper central incisor was missing; the teeth and gums were apparently quite normal. On examining more closely a small sinus was discovered leading up to the roof of the missing central incisor, and a film made from the sinus showed a large number of pus cells loaded with organisms. Cultures were made and the organism was isolated in practically pure culture; the blood tested against this organism gave a low opsonic as well as a low phagocytic index. A vaccine was prepared and injections were given, commencing with ten-million doses. After four injections the sinus was opened up under a general anesthetic and was found to lead into a cavity in the bone about the size of a small hazelnut. This was cleared out with a sharp spoon, and the lateral incisor also was removed, the cavity extending under its root and invading the periosteum of the tooth. The improvement of the joints which had commenced with the inoculations received a slight temporary set-back as the immediate result of the operation, but improvement soon recommenced with continued vaccine therapy, and the patient has steadily improved and is now almost well. The case is typical of many mouth infections, an exceedingly small local case producing somewhat suddenly generalized and widespread infection. The sinus had been present for over a year previous to the development of the arthritic symptoms, and there was no exacerbation of the mouth disease preceding the joint swellings. The tooth had been crowned some years previously." Then farther on he says this: "Lambert, in a special enquiry into the causes of rheumatoid arthritis, states that in 122 cases of rheumatoid arthritis where special enquiry was made for an infective focus 141 of the cases (76 per cent.) had badly decayed teeth, or the teeth had dropped out."

Now, this is only one of many articles that have been written by physicians recently, showing the important part or relation which mouth infection bears to constitutional disorders, and, as I have stated, I believe, when the medical profession wakens up a little more, and when the public in general awakens to the conditions as they now exist, that great demands will be made upon the dental profession, and we will have to take some greater steps to supply that demand. In brief, as I said at a meeting in Winnipeg last week, I believe that in the future vaccine will be very commonly used in the treatment of those diseases, the injection of which we hope to increase the opsonins in the blood. Also that the bridgework of the future will be largely removable, and in connection with that there are several slides shown by the essayist in which semi-removable bridges were used. I would like to have him explain a little more fully in regard

to that. Personally I do not think those semi-removable bridges are acceptable, or sufficiently so to justify their use. I think a bridge should be built and made as antiseptic as possible, or preferably a removable bridge which the patient could remove. I thank you very much.

Dr. Pearson not being present, the President called for general discussion.

DR. McDONAGH: Mr. President and gentlemen: Unfortunately I cannot discuss the paper. I have not heard the paper, nor have I seen the slides thrown on the canvas that Dr. Hartzell used, but I was fortunate enough to see some of the slides not thrown on the canvas, but in Dr. Hartzell's possession, and I have had the great good fortune to have talked with Dr. Hartzell, and I know perhaps something of what he has said. What I say on the subject must necessarily be taken from what I have heard Dr. Garvin say in his discussion, and knowing Dr. Garvin's ability I quite realize that he has covered the paper pretty fully. I want to say that Dr. Hartzell is not sufficiently appreciated in this country because we have not heard him often enough. I do not believe, from my knowledge of the man, and my knowledge of the subject, that there is a man better fitted to talk on this subject than Dr. Hartzell. Perhaps I do not always agree with him. I may not agree with everything he says, but I quite understand that his knowledge in certain direction is far superior to mine, and of course you can understand where I put myself. I believe Dr. Hartzell said that always pyorrhea—and I don't like the word—was the result of local conditions. I do not agree with Dr. Hartzell. I have seen a number of cases similar to the one cited by Dr. Garvin where there was absolutely, so far as you could discover, no connection between what Dr. Garvin described as the first or cardinal abscess and the gingival margin. Of course a great many cases we meet are the result of local infection. I kept account of the number of cases which came under my notice for five years, and in that five years (and you know I treat nothing else but pyorrhea practically the whole day long), I had just a little less than one hundred cases—that is, one hundred teeth—out of all the number of teeth that I treated which could not be accounted for by local infection, and that is a very, very small proportion of the number of teeth I would treat in that length of time. So that you can quite easily see a man who has perhaps few cases to treat might not see very many. You gentlemen know that the cases sent to me usually are the difficult kind, including those which do not show a connection at the gum margin. Dr. Garvin spoke of the etiology. I do not know what line Dr. Hartzell took, and Dr. Garvin did not say enough to give me an idea, but I believe that Dr. Hartzell's position is something the same as mine on that question. There is an investigator by the name of Dr. Timothy O'Leary. Perhaps everybody does not agree with what he says, but he seems to have put the

subject from the micro-organic standpoint on a basis that we might understand. He attributes the disease almost entirely to the fusiform bacilli which we find in nearly every mouth, in the normal mouth, but under certain conditions that micro-organism can become pathological perhaps by the assistance of some other micro-organism or by the product of some other micro-organism, and to that micro-organism Dr. O'Leary attributes what we call pyorrhea alveolaris. I just mention that subject, not to go into it, but so that Dr. Hartzell may go into it more fully in the discussion when he is replying. It is always well to have a subject brought up so that we can express our view. Now, with regard to the planing of the roots, Dr. Garvin says he does not believe it is a crime to plane deeply. I think the mistake is made on the other side usually. In a case of long standing we often do not plane deeply enough. We leave the soft tissues in the root surface as a source of infection or continuation of the disease, and in that way we prepare for a recurrence of the disease. Supposing we do plane too deeply; supposing we cut through that outside layer which is just underneath the periodontal membrane and we expose the lacuna and the little sharp edges, and we cut the gum tissues away properly, because it is in the majority of cases necessary to destroy the diseased gum tissue, and the new granules form, and the marginal opening is closed, how is infection going to get in? Of course you will say immediately that we are not all skillful enough in having that happy result in treating the disease. That is true, but we should all strive to have that result, and in a little while we will. We are all familiar with the effect of that. The tissue has a tendency to contract, and if we can keep that pocket sterile for a short time the tissue will contract sufficiently to make a comparatively tight margin and close in around the tooth. Personally I do not depend entirely upon my instrumentation for doing away with the sharp points which surround, or the little depressions which may be produced by cutting into the lacuna. I use chemicals to destroy the bony tissues. I use hydro-chloric acid and I obtain good results from it. I break down all sharp pieces of bone and disinfect everything I touch with my hydro-chloric acid. Not only that. If I have not properly cleaned my root, or scraped my root, or filed my root, or whatever method I use, I will remove any particle of deposit which may be left on the tooth's surface, even though they are microscopical chemically. I am going over this rapidly. Of course you have to be careful in using your hydro-chloric acid and acetic acid and that sort of thing, but it is not my province to go into that. Before leaving that question of planing the roots, I have watched Dr. Good, of Chicago, and I have seen his results. Now, I am not going to compare Dr. Good's results and Dr. Hartzell's results. I do not say that Dr. Good is the most careful man in the world, but I have seen results from his operations which certainly surprised me, and as far as I can see Dr. Good does not plane his roots at all, nor does he file his roots, and he

uses no acids. He is very thorough, and perhaps you would call it severe, but he gets results simply by using his scrapers. Perhaps he get the same results from the scraper that a man does who planes or files, but I don't believe he does. It may be that the cases which have come under my notice and which have been treated by Dr. Good, had not the surface of the root very deeply infected. That is possible, but I have seen some splendid results from his method, and also from the methods adopted by Dr. Younger.

With reference to the formation of new bone, I have to differ with Dr. Garvin most certainly. I have not the slightest doubt that I have had dozens of cases in which new bone has formed in the pocket without moving the root at all. I have cases years old now where I feel certain that the bone has not only grown after I operated, but the bone has been growing practically ever since, and it will grow, but if the pocket is deep and runs down between the bone and the tooth be sure to do your operation thoroughly and it will fill in with new bone. Whether it grows toward the gingival margin to any great extent I would not say, but it certainly fills in that particular pocket. Dr. Garvin said he did not think the pockets were filled, but when he is some years older, and has lived some years longer, I think he will make the same assertion as I am making now, and I think Dr. Hartzell will bear me out in that. I do not see any reason why new bone should not form, and I think it does.

Vaccine was spoken of by Dr. Garvin. You know in our little town of Toronto we have a man—Dr. Ross, who has spent some time with Dr. Almroth Wright—using vaccines extensively, and he claims to have had a very great deal of success, I believe. Although he has had a certain amount of success, we have to be very careful what we say about success in pyorrhea, following the use of vaccine. It has been my good fortune to treat a number of patients who have been treated by the vaccine method, and I have had a little experience along that line. When the theory first came out, of course I thought that it was going to be a very great help to us, and I studied it as far as I could at the time, until I came to the conclusion that it was not going to be the help that I expected it would be, and latterly I have not bothered very much about it. The vaccine treatment, the raising of the opsonic index is of use to the general practitioner after the dentist or the specialist, or whoever takes charge of the case, has removed the irritant. After the pockets have been all thoroughly made septic and cleaned out and put in as good condition as we can, and the source of infection has been done away with, then the vaccines are certainly of very great benefit to raise the opsonic index of the patient so that the general health of the body can be restored, but to expect vaccine to clean out a pocket and do away with the deposits of lime salts and debris and broken down tissue, is expecting too much, and that is what is expected by the various men who are talking

on this subject—that is, the medical men, not the dentists—but sometimes the success that the medical man obtains, when investigated, is only partial success.

Just one word about bridges. Dr. Garvin spoke of bridges, and I want to say that I agree entirely with Dr. Garvin. From the standpoint of the man who is treating pyorrhea, the removable bridge is the only kind of a bridge. If you can take a number of loose teeth which are not immediately one next the other, separated by the extraction of some of the teeth, or perhaps once in a while by the teeth separating far enough to leave a space large enough for a tooth to be inserted, if you can attach those teeth by a solid bar and on that solid bar place your removable bridge, that is all right, and I favor the Gilmour attachment. You are getting the nearest thing you can to an ideal restoration in that particular case. I do not believe in removable bridges where you have not the bar supporting the teeth. You need the bar to strengthen the teeth, to take the place of the lost alveolar bone, and then the bar and the gum tissue and the teeth help support the bridge, and you have, as near as you can get, an ideal result. That is all I have to say, excepting to congratulate you on having such an eminent man as Dr. Hartzell in your midst at this meeting.—(Applause).

DR. READE: I do not wish to discuss the paper, but there are a couple of questions I would like to ask. I would like to know if he considers devitalization of any use in any case in the treatment of this disease; and I would like to ask him how he treats the case of a cuspid tooth over which there is a great convexity of the root and possibly the tissue rather thin. I would like to ask when that gum is receding, or the bone is receding, possibly half way up the root, is there any treatment by which that can be stopped, or what is the cause of it, or if that bone can possibly be brought back in that case.

DR. HARTZELL: (Closing discussion). In writing a paper upon the topic assigned me, I had in mind one particular thought, and it was this, that oral sepsis is a condition that obtains in the mouths of the whole body politic, and that the wasting of the alveolar bone which supports the teeth is going on at all times, and that it is a possible thing for the average practitioner, if he will only waken up to the fact, to prevent the enormous loss of teeth which now obtains, by learning where the point of irritation is, in the greatest number of cases, which induces this loss. I put eight or ten slides on the screen last night from three or four different authors. I know that those men have exhibited sections and refer you to the journals in which their work can be found and examined. I know they have exhibited sections which show deep inflammation in the body of the bone, and I purposely left those out of consideration, and I chose those slides to show to you, which many of you saw, pictured acute inflammation at the

gum margin, and I did it for the very reason that I wanted you to, if possible, see that that gentle, or mild, inflammation that occurs at the gum margin, is the most important thing for you to look for and attend to, because if you look for it, and scrape it out, you are going to prevent loss of the alveolar process and thereby save the teeth. In striving to bring out that point particularly, I seem to have left in the minds of some of you the idea that I believe that every inflammation begins in the gum margin, which I do not. I do believe that the great majority of them begin in the gum margin, and for that reason chose those slides which illustrated that fact. I meant to put on the screen again this evening half a dozen or more slides that illustrate that fact, but as we cannot do it, I will pass that part of the subject.

I am just as confident as any of the rest of you are, that if you plant an infection by way of a root canal, you are going to have a pus flow. I do not call that a pyorrhea, because the word pyorrhea has come to imply an inflammation which involves the bony socket and always the level of the socket, and thereby gradually extrudes or loosens the tooth. I did not attempt to classify these inflammations, but I did attempt, and am attempting now, to make clear my position regarding the chief etiological factors which lead to the loss of bone, in order that you will be vastly more particular in stamping out mild marginal infections, because a mild marginal infection or inflammation makes a lesion which leads to an infection, which in turn destroys the bone and eventually loosens the teeth, and that mild marginal infection is distinctly in the control of every dentist, if he would only do it, but on account of its mildness, he passes it by, and the trouble goes on, until deep pockets have occurred, and then, perchance, he becomes quite scientific, and takes a few sections and finds the whole bone is involved, and jumps at once to the conclusion that it was a constitutional infection that distributed the infection in the whole body of the jaw, and forgets, or fails to know, the case history from its inception, to that deep distribution of infection in the bone. That is exactly what I think Dr. Talbot and Dr. Smith and Dr. Zemineski have all done. They have not given us complete case histories. They have taken these cases out of the hospitals, and we do not know what happened to those cases prior to the time they got those jaws. Of course, they did find these deep infections; their pictures show it, but if you take the normal sections they show, and the beginning sections they show, and they invariably give the pictures which you saw on the screen.

Tumefaction; massing of leukocytes at the gum margin, and gradually proceeding towards the deeper structures; destructive inflammation. Now, there are a few simple instruments, if used in the hands of every dentist here, would lessen by seventy-five per cent. the tooth destruction of every man in this room. (Hear, hear). Now, that is worth an immense amount to the people who are served by you, and it means better health

and increases the asset of the State in its people, when you limit and shut out these infections, and I want to state again that wherever the least bit of marginal process is lost, you have established a culture. but that is beyond the reach of the leukocytes, and that is why you should go under that gum margin and remove that culture, no matter how small it may be. The idea that it is small, and not worth while treating, is a mistake, and wherever you can place an instrument below the gum margin, even if it is only a line or two more than the normal depth, be sure you remove the infected dead membrane and pitted surface from it.

So many things were brought up that I have forgotten some, but I will move on and speak of the development of bone. You will find, if you choose to consult it, a most interesting book on the development of bone that has yet been written. It comes from the pen of Sir William McKeown, and it is just out of press. He has demonstrated beyond the shadow of a doubt that the new bone does not come from the periosteum, as I have for years believed, but it comes from the existing bone cells, and he has demonstrated that the bone develops very rapidly under certain conditions. One of the experiments which turned out most successful was to take out a couple of inches off the shaft of a long bone and insert between those cut ends a glass tube, and he has numerous pictures of the new bone which grew out into the glass tube from the cut ends of those bones, where it was absolutely impossible for the periosteum to influence it in the least. Now, if that is a possible thing, there is absolutely no reason why we should not have reproduction of bone around teeth. It hinges on the fact of shutting out infection and relieving the area of tension. Where that can be done any bone will grow, and I am just as confident as is Dr. McDonagh that new bone does grow around the teeth. It was my experience to be working on a case where about two inches of the jaw had to be removed. I did not know about the advisability of inserting a piece of bone to hold the ends apart to regain the usefulness of that jaw through this splint of new bone, but I did put on a metallic splint which was attached to the two molars and the bi-cuspid, and that bone has reached out and practically united, and I was able to remove that splint last month, and the jaw does not fall together. In the very centre it is somewhat membranous yet, but the possibility is, judging from the amount of new bone that has formed from the cut ends of that jaw, it is going to be sufficiently strong to hold a denture upon it. Now, if it is possible for bone to grow out from the cut ends with the use of a glass tube, then we may confidently look towards the rebuilding of bone of the process if we can only overcome and exclude infection, and if we can do this it will vastly increase the usefulness of many teeth that are now lost.

In regard to bridge work, mentioned by Dr. Garvin, I would say this, that bridgework has been in the process of evolution in my own practice

for many years. I first commenced with fixed bridges, and I finally discarded fixed bridges and used bridges which were in part removable and in part fixed. I thoroughly agree with Dr. Garvin, that the bridge which is removable by the dentist, maintained by set screws or any other device, is not as sanitary as it might be, but it is better than the cemented bridge in that if any of the teeth go wrong under it, you can take it off and repair the bridge, or take out the tooth that is offending and replace it without the loss of any of the work that has previously been done. But the bridge that is removable by the patient, resting upon the roots of the natural teeth from which the pulps have been removed, and which have been properly crowned by low flat crowns, is the ideal thing. In one particular I would disagree with my friend, Dr. McDonagh. It is not necessary to unite these separate teeth by a bar. The objection is if any one of those teeth loosen under that bar then the whole thing has to be broken up in order to take care of that one, but if the bridge work, which is made to slip over and rest upon these roots, is constructed so that it will hold those roots just as readily as the bar will hold them, then there is no need of putting the bar in, and that can be done, and that obviates the necessity of making them all together, and if a tooth has to be removed, it can be removed without sacrificing anything in the removable bridge, and consequently, if you need to, you can fit in a saddle and let it rest upon the gum where that tooth was. That is the reason for advocating that particular method of practice in the type of case under discussion.

DR. READE: I asked where there was no apparent infection there that you could see, and yet the gum recedes from the cuspid tooth, the labial surface more particularly.

DR. HARTZELL: In that type of case, in that specific infection in which there is recession of bone and consequently gum margin, we have the case in which we are the most powerless to deal or to check. I have seen a number of cases of that type—a considerable number I will say—where I believe the recession and destruction of bone has been induced by the over stimulation of the tissues by the tooth brush. Now, it is quite possible to stimulate the tissues with the tooth brush so as to cause resorption. Infection is not necessary to cause the absorption of the tissues, for over-stimulation will do it. I have noticed with numbers of people, who were right-handed and very vigorous, a transverse motion over the gum, where they have not only caused resorption of the bone, but actually cut grooves in the tooth. I have seen it in the mouths of both right and left handed people. Your left handed individual will have that resorption on the right side of the mouth, and the right handed individual will exhibit it on the left side, all of which tends to the belief in my mind that it was due to the undue cross stimulation with the brush, and I have been impressed with the idea where they have been over vigorous, massaging all the gum margins to drive out the congested blood in the gums and reduce the tumefaction. I have seen cases where

they actually did harm with the brush, with too vigorous massage. And then there is another condition which we term senile absorption, in which no inflammation exists. Talbot aptly describes it, and calls it an absorption that is due to senility. Now, it is not necessary to be old to be senile. I have a picture of a boy, and I could show you the individual if you were in my city, who is only twelve years old, and to contemplate his face in a photograph would give you the impression that he was fifty. He has not a single tooth in his mouth. There is a case of senility in a child of twelve years of age. We do find this senile absorption, which we cannot explain, and in which we do not find any infection, and I cannot explain it. I do not know what it is, beyond the fact that in certain mouths that have been over stimulated, where the cross brushing or massage has been heavy, I find it is more rapid than in mouths in which the brush is not used.

DR. READE: I have seen some cases where there seems to be a bloodless condition of the gums.

DR. HARTZELL: Anemia. In the last analysis these conditions mean circulatory disturbances. In the beginning of the disease that may be induced, as I stated in the paper, and as Dr. Garvin stated in his discussion, by local causes, but in the end they may involve not only the local tissues, but the tissues of the whole body, as has been stated by different authors who have discussed this question.

The chief point that I wish to establish, as I said when I rose to my feet, is the fact that if you check these incipient inflammations in the gum margins and practise rigid prophylaxis and teach your patients to exercise that care of the mouth which reduces oral sepsis to its minimum, (and that is within the reach of every one of us,) we can save a great number of teeth which now are lost.

I neglected one question. In the matter of devitalization, I would say this: that a great many of these teeth that have lost a large amount of their bony substance, have atrophy of the pulp—for the pulp is supposed to stimulate, and nature never intended it to be exposed, and the result is that the pulp recedes in the tooth, and in many cases where I have devitalized those teeth, I have found the upper portion of the pulp chamber empty, and I am convinced in my own mind where a considerable area of root surface has been exposed through the loss of the over-lying tissues it is the advisable practice to remove the pulps from such teeth.

I have enjoyed meeting you very much, and I want to thank you from the bottom of my heart for the courtesy you have shown me.—(Applause.)

DR. THORNTON: Just before closing that subject, I would like to move, not in any formal way, that an expression of our gratitude be given to Dr. Hartzell for coming here, to show our appreciation for what he has done.

I would just like to say also, that I was delighted with the discussion of the paper by my good friend, Dr. McDonagh. I said to my friend

that as long as I had known him, I had never heard him do so well as he did to-night.

DR. SECCOMBE: I have very much pleasure in seconding the motion.

The President put the motion, which, on a vote being taken, was declared carried, and Dr. Hartzell was accorded a hearty round of applause.

DR. HARTZELL: I can just say once more, I deeply appreciate the honor you have conferred upon me.

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A METHOD OF TREATING ROOT CANALS

P. B. McNALLY, D.D.S., L.D.S., SOUTH EDMONTON, ALBERTA.

Read before the Alberta Dental Association at Banff, Alta., July, 1912.

In attempting to discuss this subject after such men as Kirk and Buckley, I feel that the same relation exists as that between the Lilliputians and the great Gulliver. What I am about to submit to you, however, is not a thesis, but rather a combination of the most essential points gleaned from the methods of others, with, perhaps, here and there a touch of my own. Practical adaptation of the same method by different men is bound to differ slightly, owing to that peculiar quality which distinguishes a man from his fellows—individuality.

I am going to discuss in this paper only that procedure which follows after the devitalization of the pulp. The usual methods of devitalization by arsenious oxide, cocaine and adrenaline, carbolic acid, wood points, etc., need not be mentioned especially here, as each has its own particular use in every man's practice. Let us now start with a tooth in which a devitalizing agent has been sealed for a sufficient length of time to cause strangulation. The rubber dam should first be adjusted to include one tooth on either side of the one to be treated, if possible. This permits of light and good access to the cavity, without which it is impossible to perform a thorough operation of this nature. I would strongly recommend the use of the rubber dam in all these cases if at all possible, as, leaving infection out of the case altogether, there is great danger of getting some of the drugs on the soft tissues.

After the cavity has been opened, the cement and all the contents of the cavity are removed by means of sharp burs and excavators. The cavity is sterilized by a fifty per cent. formalin solution and wiped with alcohol. Then the cavity is extended to include the whole area over the pulp chamber. Do not be afraid of sacrificing tooth structure to get this result, as tooth structure is of no avail without the foundation of healthy roots. The next step is to cleanse the cavity thoroughly by syringing with warm water, followed again with formalin and then alcohol. Then with a large round bur open the pulp chamber, leaving no overhanging walls of dentine to obstruct the light. If any hemorrhage occurs, a small pledget of cotton saturated with adrenaline chloride will stop it at once. The pulp chamber should now be flooded with formalin solution and the excess removed by dry cotton.

We are now ready for the use of broaches. The first one should be a fine smooth swiss broach, with which it will be possible to locate and determine the number of canals to be treated. After each canal is located, the broach should be introduced into the canal as far as possible to separate the pulp tissue from the wall and make a passage for the barbed broach. It will be found advantageous to dip this swiss broach in creosote before

introducing it into the canal, as there is less tendency to catch on the filaments of the pulp and so carry it back towards the apex of the root. The next step is the introduction of the barbed broach for the removal of the pulp. I use for this purpose Donaldson broaches, made by the S. S. White Co. in the two sizes, fine and extra fine. In my opinion, there is no earthly need of the larger sizes which are placed on the market; indeed, some of them ought to be condemned, as their use spoils many a conscientious endeavor to get to the apex of tortuous canals. Any hemorrhage which may occur at this time is stopped by the introduction of creosote on a small cotton wound broach up to the apex of the root. After every shred of pulp tissue has been removed from the roots, a mild antiseptic and sedative, such as creosote or oil of cloves, should be used to wipe out the canals, and a little should be pumped by means of a smooth swiss broach through the apical foramen.

The tooth is now ready for the root canal dressing. Opinions differ with regard for the necessity for this, many authorities claiming that there is less danger of infection of the root if the pulp is extracted and the canals filled at the same sitting. In cases where the pulp has been exposed through the inroads of bacteria, and in fact in every case where the patient's time can be given, I advise the second treatment of these canals before the filling is introduced. The dressing which I advocate after the creosote consists of a fifty per cent. solution of formalin. This is applied on cotton on a smooth broach, which is withdrawn, leaving the cotton extending about halfway up to the apex. This is to insure the protection of the nerve trunk at the apical foramen against irritation from the too close proximity of the drug. In this way the formaldehyde gas makes its way up the root and, owing to the presence of the creosote, sterilizes without undue irritation.

Base plate, gutta percha or cement should now be used to seal the tooth. I find calxine very useful for this purpose, as well as for the sealing in of the arsenious oxide and other temporary work of this nature. This treatment may be left in the tooth anywhere from twenty-four hours to two weeks without any fear of bad results. I usually let it remain for one week. When the patient returns, the rubber dam is again applied, the treatment removed and tested for odor. In most cases the dressings are sweet and clean, and the odor of the drug is distinguishable.

After the removal of the dressings, the roots are further tested by the introduction of H_2O_2 to the apex. If there is any infection, a slight bubbling may be noticed on the removal of the cotton, but this test is by no means infallible and is not always practicable. In cases where there is any doubt I insert a broach carrying a very thin wisp of cotton wrapped tightly round it, which has been dipped in a fifty per cent. solution of H_2SO_4 sulphuric acid. This is carried carefully just to the apex and then withdrawn. It is then followed by a solution of $NaCO_3$, bicarbonate of soda, introduced in the same manner. Immediately before the use of

the acid the canals must, of course, be wiped out with alcohol and dried.

The canals must be again carefully wiped out with alcohol after the NaCO_3 , until all yellowness disappears from the cotton. The action of the sulphuric acid changes the fatty or minute particles of animal matter which remain in the canals into a soapy material, which is in itself an antiseptic and germicide. The NaCO_3 , of course, neutralizes the excess of acid and causes a bubbling which moves down to the pulp chamber when the broach is withdrawn. I have been pursuing this course of treatment for over a year now, and I have had most gratifying results, even with very obstinate cases.

The decalcified material having been thoroughly removed by alcohol, and the pulp chamber dried by cotton and hot air, the next step is the drying of the canals. I accomplish this by means of the platinum root canal drier attached to the switchboard. I suppose this instrument is not in use among many of you gentlemen, as a great many towns have not as yet the proper electrical current necessary for the installation of a switchboard. I have brought the instrument with me, which may be of interest to some practitioners who are not familiar with it. It consists of a small tapering platinum wire, which can be bent easily to any angle desired, and can be inserted into almost any root canal. Of course, there are a few extremely small canals where this instrument cannot be used, but they are the exception rather than the rule, and in those cases one has to resort to the hit or miss methods of the hot air syringe. About fifteen volts of electricity is required for the use of this instrument, but this can be regulated by the rheostadt on the switchboard. The current is controlled by a sliding switch on the handle, which is held in the hand, so that the current can be turned off instantaneously if desired. Before the current is turned on, the root filling should be prepared and placed within easy reach on the bracket table. The current is then switched on in the hand, and with the other hand holding the mirror, the platinum point is inserted slowly up the canal to the apex. The temperature of the wire is from two hundred to two hundred and fifty degrees Fahrenheit. The instrument is moved slowly up the canal with a forward and backward motion. When the end of the canal is reached, I keep it in this position until the patient just feels the heat, when it is slowly withdrawn. I then introduce my oxpara root canal filling, which has been mixed just as thin as will allow of its being carried on a smooth swiss broach. By a pumping motion I work it up the canals until I feel that the apex of the root is reached. Then follows the gutta percha point, which has been dipped in oil of eucalyptus. The gutta percha point is forced slowly up to the end of the canal.

In this way one is sure of having an antiseptic filling around the apex of the root, as the thin oxpara is carried ahead of the gutta percha point, and is thus forced into the most tortuous and minute passage. The oil of eucalyptus slightly dissolves the outside of the gutta percha, which causes

it to adhere to the canal, making an airtight joint. By this method a very small quantity of the oxpara may be forced through the foramen, but this can be readily noticed by the wincing of the patient, and a slightly larger gutta percha point may be substituted.

In conclusion, I may say that the above course of treatment takes time, and time is an important factor in our profession. Nevertheless, the wisdom of building your house upon a rock has never been disputed, and I venture to make the assertion that the end obtained by careful and thorough treatment of root canals justifies the means.

ROYAL DENTAL HOSPITAL OF LONDON

PAMPHLET GIVEN TO EACH PATIENT WITH INSTRUCTIONS ON THE CARE OF THE TEETH.

A Sound Set of Teeth is Essential to Health.

The teeth are formed during the early years of life, and their structure is influenced by the care taken in feeding children during those years.

The Feeding of Children.

The proper food for a child during the first eight months of its life is the milk of the mother and nothing else.

If the breast-milk is insufficient the child should not be weaned, but some of the breast feeds should be replaced by cow's milk mixed with water. In the event of the mother being unable to suckle the child at all she should give it cow's milk, mixed with water or barley water.

The following table shows the average quantities suitable at the different ages for each feed:

	Milk.	Water or Barley-water.
In the first fortnight	1 to 1½ tablespoonfuls	to 2 to 2½
“ second “	2 tablespoonfuls	to 3
“ “ month	3 “ “	4
“ third “	4 “ “	4
“ fourth “	5 “ “	4
“ fifth “	6 “ “	4
“ sixth “	8 “ “	4
“ seventh “	9 “ “	4
“ eighth “	10 “ “	4
“ ninth “	12 “ “	4

A little sugar may be added to each feed, and occasionally a little fresh cream.

Do not give the child anything but diluted milk till some teeth are cut.

If none have appeared, however, by eight months, add a tablespoonful of fresh gravy to the milk in the bottle twice a day.

When teeth are present the child may have bread and milk, porridge, rusks, bread and butter, milk puddings, gravy and a little potato, or gravy and bread crumbs, the yolk of a lightly boiled egg, or some bread fried in bacon fat once a day.

In towns it is best to boil all cows' milk for a minute as soon as it is received. After this it should be kept covered up in a clean glass or earthenware vessel in a cool place. All water used to dilute the milk should be boiled.

No preserved or condensed milks, or patent foods are suitable substitutes for fresh milk; although some children may fatten on them such a diet is very apt to produce trouble later on.

Meals should be given at regular times, and no food should be given between meal times.

Do not give meat or fish before the child is two years of age.

Do not give tea or coffee to children under five years of age.

Do not give any stimulants to children, except under direct medical advice.

The Cutting of the Teeth.

A child should cut its first teeth between the fifth and seventh months, and at the age of one year should have eight teeth. The first double teeth should appear about fourteen months, the canines (commonly called eye teeth) at about eighteen months, and the second double teeth soon after two years.

Delay in the appearance of the teeth is often an early indication of rickets. If the teeth are late in appearing the child should be taken to a doctor.

The first teeth of the second set to appear are four big double teeth at the back of the mouth behind the first set. These teeth may be cut at any time between five and eight years of age, and are the most important teeth in the head. Special attention must be given to the cleaning and preservation of these teeth. Between the ages of six and eleven the first set of teeth is replaced by the second set; soon after eleven years four more big double teeth appear at the back of the mouth, and at any age after seventeen years the "wisdom teeth."

If the teeth come in an irregular manner advice should be sought, as a little early attention often saves much trouble in the future.

Children should not be given indiarubber comforters to suck, because they are not cleanly and are liable to cause irregularity of the teeth.

Decay and Early Loss of the Teeth.

Decay (caries) of the teeth is due to particles of food remaining on or between the teeth. These food particles ferment and form acids; these

acids dissolve the tooth, forming a hollow or cavity. The cavity increases in size, and sooner or later the nerve (pulp) becomes exposed, and in time an abscess may be formed. The teeth usually decay in places that cannot be easily seen and the decay has often advanced considerably before the cavity is noticed by the patient.

Early loss of teeth by their becoming loose and falling out is a disease quite as important as decay, and can only be properly treated in its early stages. Advice should immediately be sought if the teeth begin to get loose or the gums become inflamed.

The Ill Effects of Diseased Teeth.

Children with decayed teeth cannot properly bite the food given them; often because of tender teeth they refuse their food, and as a result do not obtain sufficient nourishment to allow full growth and development of the body. In the cavities of decayed teeth, the food decomposes, and the products of such decomposition, together with the discharges from the diseased gums around the teeth, are swallowed, causing indigestion and other forms of stomach trouble. Even more serious illnesses may arise from the same cause. Enlarged glands in the neck and other local troubles are extremely common in such cases. All these diseases can be avoided by proper attention to the teeth.

The Ill Effects of Mouth Breathing.

A child should breathe through the nose. If the child cannot breathe freely with the mouth tightly closed, medical advice should be sought, because the teeth are more liable to decay and other and more serious ailments may result.

The Preservation of the Teeth.

The kind of food eaten has a great influence on the teeth. Soft foods are more liable to cling about the teeth, whereas harder food, which is often more easily digested, requires more "biting," and in this way the teeth are kept cleaner, and the growth of the jaws assisted. It is essential that children should be taught to chew their food thoroughly. Food should only be given at definite and regular times. The constant sucking of sweets is a fruitful source of decay of the teeth.

The following rules should be observed:

1. The teeth must be kept clean.
2. Use a small tooth-brush with stiff bristles. Use a little soap and some precipitated chalk.
3. Brush all the teeth thoroughly, especially the back ones. Brush all surfaces of the teeth.
4. Clean the teeth immediately before going to bed. Take no food of any sort afterwards. Clean the teeth again in the morning.
5. Clean teeth do not decay.

If a tooth decays it should be filled or removed; on no account should a decayed tooth be left without treatment, even when there is no pain.

THE COMBINATION OF SILICATE CEMENTS AND GOLD INLAYS

A. B. MASON, D.D.S., L.D.S., EDMONTON, ALTA.

Read before the Alberta Dental Association at Banff, Alta., July, 1912.

I have found it advisable to insert this class of filling under certain circumstances, and think it is indicated under the following:

(a) Young patient. It is advisable to retain crown of tooth as long as possible, so that, if necessary, later on Davis or other crowns may be adapted, thus directly lengthening the time of the usefulness of the root.

(b) Where it is impossible to find a perfect or even a good match for porcelain or other crowns.

(c) Where crowns are contra indicated by close or irregular bite.

(d) Where patient wishes to retain the natural tooth.

MODUS OPERANDI.

Devitalized Tooth. Prepare base of cavity as square as possible, cutting the lingual surface of crown so that post may draw freely from canal. Insert post and make wax form as ordinarily done for inlay work. When proper contour has been obtained, remove the wax from labial surface with the exception of a narrow margin on incisial and approximal surfaces. These margins are then slightly undercut for retention of silicate. Form is then removed and cast. Before setting inlay it is advisable to select with care, as to color, the silicate used. A good method is as follows: Mix several of the mixtures nearest to the color of the tooth and then place them on enamel, thus getting a color which, when set, should be almost perfect. Silicate selected may then be tested by placing the mix in the bath of potassium sulphide, allowing it to remain for twenty-four hours. This test will prove if discoloration will take place in the mouth. These points being carefully ascertained, the inlay is cemented into place, dam adjusted, free margins of enamel undercut and silicate inserted, proper instrumentation should be given, thus assuring a filling which will be smooth and not require discing after setting, as this tends to leave the surface more or less rough and thus without the natural gloss required.

AS TO DURABILITY.

I have found this filling will stand considerable shock owing to the margins being protected from mastication. The acid test giving durability as to color and proper instrumentation as to the life of silicate.

It is superior to a foil filling, due to denseness of cast gold.

AS TO THE TIME INVOLVED.

Comparing this method with adapting crowns, I find it takes a longer time, say from three to four hours, but I believe one is rendering a superior service by so doing.

AS TO FEES.

Seldom are fees mentioned at conventions, but here I think it is necessary to do so. This method of restoring teeth takes up extra time and requires extra skill on the dentist's part, and for such he should certainly receive a greater compensation than for a simple crown. I have found that the average patient desires the best and most lasting results and is quite willing to pay the extra fee involved.

PRESSURE ANESTHESIA WITH NOVOKAIN-SUPRARENIN-RODS

DR. E. R. CZERWINSKI, DANZIG.

Translated by Carl E. Klotz, St. Catharines, Ont.

I do not think that I make a mistake in stating that we have all felt the want of being able to remove the pulps, and to fill the canals and tooth in one sitting.

Many a time we get a patient with toothache caused by an exposed pulp and who is not able nor in a position to make several visits to the dentist, as is necessary when devitalizing a pulp with arsenic, cobalt, etc. Particularly practitioners in smaller towns have patients from the country, living at a distance, for whom it is difficult and sometimes impossible to make several visits. For such cases it has been the aim of investigators, who have spared neither time nor means to obviate this, but so far their results have been doubtful.

Pressure anaesthesia so far has not found general favor, the same with cataphoresis and others.

There has now been placed on the market in Germany a preparation that in my opinion and experience with it, satisfies this demand. It is sold under the name of Novokain-suprarenin-rods.

With Novokain-suprarenin you are all acquainted, as it has been used for some time, and has been very serviceable. For injecting purposes it is to be had in liquid form (ampules) or solid (tablets). Now this new preparation is made into very small rods, and is very applicable for anesthetizing the pulps of teeth.

When my attention was first drawn to this new preparation I was rather skeptical, as with so many other preparations with high sounding names that have been placed before us, but had to be discarded and left us richer in experience, but poorer in pocket. With this preparation I have had better results—and have good reason to believe, from the experience and experiments in my practice, that it will be extensively used in the near future.

With children and timid and nervous grown up patients where the

work has to be done in one sitting, I consider it very useful. It is particularly serviceable in cavities that extend under the gums at the buccal and labial surfaces of the teeth, where frequently, even with the best of care, when arsenious paste is used, that some of it ooze out of the cavity and destroy the gums and injure the alveolar process.

The bloodless condition with which the work can be done when using this preparation cannot be overestimated, which is of particular value with children where the apical foramina of the root is often very large and open, causing an abundant flow of blood in removing the pulp when treated with arsenic.

After treating with this preparation the pulps can be removed without the slightest pain and the root canals filled immediately.

We have used these rods in cases of pulpitis with good success, where the patient was particularly timid and nervous, and where it would have been impossible to remove sufficient of the decay to expose the pulp for arsenic treatment. In such cases the preparation is placed into the cavity on the softened dentine and allowed to remain for a few minutes, it will then be found that anesthesia has taken place. We have also used it in cases in teeth with dentinoids, in these cases two and sometimes three of the small rods were required.

We have now used it in over one hundred cases, and have not had one failure, and no complaint of irritation of the pericementum.

The application is made as follows: Wipe the cavity with a pellet of cotton, but not thoroughly dry; place therein one of the small rods, if possible direct on the exposed pulp, allow it to dissolve, there being enough moisture in the cavity and pulp for this; after it is dissolved exert a slight pressure with unvulcanized rubber. Should pain ensue, stop for a few moments, then commence the pressure again. In about two or three minutes the pulp is anesthetized and does not respond to pressure. You can now pass the nerve broach down to the apex without the slightest pain and remove the pulp without blood following. Anesthesia will remain for some time, so that there is no need to hurry.

In using arsenic, cobalt, etc., to devitalize the pulp, we never know how long to allow it to remain in the tooth. Some practitioners change it after twenty-four hours, while others leave it in the tooth for eight days. I have found sensitiveness after twenty-four hours and also after eight days application in both pulp and pericementum. In the latter the pain sometimes lasted for several days. This, as before stated, never happens when using the Novokain-suprarenin-rods.

Taken altogether, my experience with the preparation has been very satisfactory, and recommend it to all my colleagues, and will be pleased to hear of them using it, and report to me their results.—From *Archiv für Zahnheilkunde*.

Dominion Dental Journal

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VOL. XXIV

TORONTO SEPTEMBER 15, 1912.

No. 9.

BRITISH DENTAL ASSOCIATION

The annual meeting of the British Dental Association was held in Glasgow, from August 6th to August 10th, 1912. There are features of this old and well established institution which are interesting to a visitor from Canada. There would seem to be three distinct features, social, professional and legislative. The social feature gets much more prominence than is given it at any Canadian meeting. The British dentists bring their wives, sons and daughters with them. There were receptions, banquets, concerts, dances, excursions, motor trips, luncheons, private, dinner parties, golfing and bowling. The reception at the city hall by the corporation of the city of Glasgow was a most brilliant affair. There were fully a thousand people present. Altogether a Canadian is struck with the important place given to entertainment. The British dentist is a good liver and enjoys life. What seemed a good feature was the luncheon served each

day in the University, where the meetings were held. The ladies and friends meet with their husbands at luncheon.

The opening or general meeting is rather a good thing. Ladies and visitors are invited. An address of welcome is delivered. The president who retired the year previous gives a valedictory address. The president who was elected the year previous delivers an inaugural address. An important feature of these addresses is that they are suited to a public gathering. The session is made as impressive as possible. Prominent citizens and members of other professions are invited to seats on the platform. It is made the ceremonial session of the meeting. The daily press make excellent reports of this session.

The professional part of the meeting is rather better attended than in Canada. Mostly the papers are printed and in the hands of the members before the meeting, the author contenting himself with giving a resume. The discussions are mostly to the point and brief. No member is allowed to occupy too much time. The discussions do not permit the inexperienced speaker much opportunity.

Although the dental supply houses made a most admirable exhibit, there seemed to be few who gave it much if any attention.

A visitor can know little of the legislative or business end of the British Dental Association. It is governed by an executive board which meets in private and brings its findings before the general meeting of members in private session. Judging from the time set apart for the discussion of business, it must be an important part of the annual meeting. From what was generally talked about among the members, it would seem that the important item of business discussed in private concerned the public. If the public were invited to be present to hear a discussion of total prohibition in dental practice it might hasten its coming in Great Britain as it did in Canada.

DR. THORNTON'S RESIGNATION

Toronto, Aug. 13, 1912:

Editor DOMINION DENTAL JOURNAL:

In a recent issue of your journal some reference was made to the fact that I had resigned from the Faculty of the R.C.D.S., and my reasons for such resignation were asked for.

Perhaps the best reply I could make would be to give to the members of the profession in Ontario a letter written to the President, in which the matter is discussed. Let me add that since writing the letter, several members of the Faculty met the President and the Dean, and discussed

matters, and made arrangements to go on as usual with the work of the session.

Yours, etc.,

A. W. THORNTON.

Toronto, June 22nd, 1912.

209 Pearson Ave.

Dear Dr. Bruce:

Yours to hand this morning. Let me say that I was very pleased with the spirit of your letter. It is the only spirit that will make the Dental College and the dental profession of Ontario all that they should be.

Permit me to make one point clear. I, like yourself, have no axe to grind, and am in no clique or combination to get anything or to do anything. Nor have I any personal animosities or vindictive feelings towards anyone.

You say in your letter that you understand that Dr. Webster and I are not satisfied with the management of the R.C.D.S. Dr. Webster and I are in no way standing together for any purpose. We have discussed the situation many times, but only because it was through him that I learned there was some question about the legality of certain acts, and also that it was he who obtained legal advice. This is "all" we have in common.

Your suggestion to get together to talk matters over is very wise and what should be done, not with any desire to vindicate any past action, or to show that things or persons are wrong, or are right, but as men actuated by a common and worthy purpose, to bring about the best results for the institution and cause in which we are all mutually interested.

We had a meeting with the Dean on Tuesday night to urge this very thing. There were present Drs. Webster, McDonagh, Price, the two Clarksons, and myself. We talked the matter over with the Dean and asked him to try to get you to come down for the very purpose mentioned in your letter—"get together and bring about harmony."

You speak of your desire to bring about the most harmonious conditions in the School and profession. I can say honestly that I think the profession generally believe that to be true. I have heard many of them say so.

But some things appear strange, to say the least.

The Board adopted a very dangerous policy when they appointed one of themselves to office, in the first place. If you will look in last night's News you will see the "principle" discussed in regard to aldermen appointing themselves to office in the city. That is where the first misstep was taken.

Let me state briefly some "facts." You can imagine the argument.

1. A director appointing himself to office.
2. First year, \$900.00 (300 hours).
3. Second year, \$1,700.00 (no time specified).
4. Third year, \$2,000.00 (no time specified).
5. Fourth year, \$2,000.00 (no time specified).

6. Fifth year, \$2,000 (each day at eleven).

After one year in the College he received \$500 more than the former Superintendent received for the same work, after nearly twenty years of service.

After two years of clerical work he receives as much remuneration as Dr. Webster receives for teaching Operative Dentistry and after spending fourteen or fifteen years in the service of the School.

One man has no time specified; the other has to put in 500 hours.

To-day the Board is paying as much for a man to do the clerical work of the School as they are paying to both Dr. Cummer and Dr. Doherty to teach Prosthetic Dentistry and Dental Anatomy. He is getting more than Dr. Cummer and I together, and Cummer must put in 250 hours and I 200 hours.

The point is this, that, as I see things, there is no comparison between the service which Dr. Webster or Dr. Cummer is rendering to the profession and to the College, and that which the Superintendent is rendering, and yet he gets twice as much as Cummer and as much as Webster.

Perhaps you saw the article in Dental Practice about the appointment of a librarian. The Board advertises for a librarian. Dr. Kennedy is appointed. Dr. Kennedy resigns. Dr. Mason is appointed (no advertisement).

The Board wants a man on the Faculty. They advertise. The Board wants a Superintendent. They appoint one of themselves.

Then there is this outstanding fact: The School exists to teach dentistry. The cost of the clerical work of the Board and School is out of all proportion to the entire income of the institution. This is the opinion of members of the Board also.

And now lest you should misunderstand me, let me repeat that I have no kind of feeling personally against the Superintendent. He has treated me with every courtesy and consideration.

It is not enough for him to say that he is not responsible for Dr. Kennedy's appointment. Had he been wise he would have opposed it. The Superintendent says he had nothing to do with the appointment. You say the same. So do the Dean, Abbott and Bonnycastle. In fact, no one is anxious to father it. Why?

But I have written enough to show you how things appear. Let me conclude as I began. Your plan to "get together" is the only wise plan. These diverse feelings, conceptions and misconceptions must be harmonized or the School must suffer and become disorganized. Were I in your place I would take the initiative.

So far as I am concerned, if you or the Board think that I can be of service (more, perhaps, than a new man) in the work which I teach, I am willing to go on; but only after such a plan as you suggest, viz., that we meet and talk matters over, and, if possible, remove any cause of, or for,

misunderstanding, for only by following such a course can the work of the School be successfully prosecuted.

In any event, whether or not I ever give another lecture, let me say that I have enjoyed my work in the School more than any other work I ever did, and I am thankful for the experience. Many kind letters have come to me, and many kind things have been said (more than I have deserved) concerning my relation to the boys of the School.

One other word. No matter how this may terminate, so far as our personal relations are concerned, there will be on my part no loss of friendship, and no loss of respect or confidence. I know that you are honestly trying to do what you think is right.

Very truly yours,
A. W. THORNTON.

WANTED—A graduate assistant with view of partnership, for Western Province. Apply Box 6, Dominion Dental Journal, Toronto.

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TORONTO, OCTOBER 15, 1912.

No. 10

Original Communications

ORTHODONTIA FOR THE GENERAL PRACTITIONER

BY GEORGE W. GRIEVE, D.D.S., L.D.S., TORONTO.

Read before Canadian and Ontario Dental Associations, Burlington, June, 1912.

Mr. President and Members of the Canadian Dental Association and Ontario Dental Society: Before proceeding with the presentation of my paper, I desire to thank very heartily the programme committee of this convention, and particularly the energetic Vice-President of the Provincial Society, Dr. Hoggan, for the honor which they did me in requesting that I give a paper on orthodontia at this meeting. I appreciate, also, the presence here this afternoon of so many of the members to hear a paper upon a subject which is naturally less interesting to the general practitioner than perhaps any other branch of his work. It is a pleasure, too, to be associated upon the programme with a number of men of considerable reputation. I would like to say that I feel keenly the responsibility of placing this subject before the dentists of Canada in convention, and have been very careful in the statements embodied in my paper, submitting for your consideration only recognized facts.

I trust you will pardon me for criticising somewhat a paper read before the Ontario Dental Society last year upon this subject, but I am glad to be able to say that the author of that paper was pleased to give me his permission to discuss again, even at this late date, his paper as fully as I might see fit, and I feel that by so doing I may be able to bring out more clearly some points of importance which must be considered in orthodontic treatment. I do not desire to cast discredit upon any system, but only to throw as much light as possible upon the subject, and I sincerely hope that the criticism will be received in the spirit in which it is given, viz., an earnest desire to lay before you fundamental principles of the science which we must understand if we are going to be successful in this branch of the dental art.

I will map out in my paper here to-day a course of reading which, if covered earnestly and carefully, will prove to most of you the folly of many of the mutilations of dentures we see advocated from time to time, and will also fit any man who will go into the subject as thoroughly as here suggested to correct very creditably many of the simpler cases. I firmly believe that it is unwise for the average man in general practice to attempt to correct the difficult cases, and a mistake for him to undertake at all even the most simple ones unless he has covered fairly well the literature upon the subject.

A considerable number of men in general practice are doing more or less orthodontia, a few of whom are fairly well posted, but I believe the great majority are working entirely without knowledge of the fundamental principles. Some men seem to think that the appliance is the chief thing, and even send their models to supply houses and dental laboratories to be fitted out with suitable apparatus. Very often only one model is sent, no account at all, apparently, being taken of the occlusion. Let me say here that one very simple appliance will correct all ordinary cases, namely, the expansion arch and molar clamp bands as perfected by Dr. Angle. These appliances, as well as wire and silk ligatures, are carried by all supply houses, and their use will give the dentist more satisfaction than any he could make himself.

An expansion arch, intelligently applied, will do almost anything that may be required of it, but if it is not correctly adjusted you will find movements taking place which you do not want at all, and may be considerably worried in your effort to accomplish the desired results. Of course an expansion arch requires adjustment from time to time; it is not possible, ordinarily, to carry a case through to completion with an arch as originally set. A lack of thorough knowledge of the application of the expansion arch leads many a man having only a superficial knowledge of the subject to imagine that the practice of orthodontia is disagreeable. It is nothing of the kind; it is very pleasant. The work which is most agreeable to any man is that upon which he is best posted, and this applies very forcibly in orthodontia.

The practice of orthodontia as a real science is young, particularly in Canada, there being in our own country only about half a dozen men, to my knowledge, devoting their time exclusively to this branch of dentistry.

It was brought out very clearly in the discussion of a paper upon this subject read before the Ontario Society last year that correct diagnosis was the most important factor in the treatment of irregularities. It is a well known fact that teeth can be moved into their normal places in the dental arch much more easily than into abnormal positions, and I might say that when the teeth are correctly placed the retention is simplified.

Models made from good plaster impressions are necessary to properly study out the required movements in any case, and the lines of the face

should also be considered carefully in order that the diagnosis may be correct. Each tooth should be placed as nearly as possible in the position which it would have occupied had nature's plan in the development of the denture not been interfered with. The type of the individual should also be considered, as all ideal dental arches are not of the same shape.

Some suggestions here concerning the taking of impressions might be of value. The system advocated by Dr. Angle is the one in general use by the specialists. Models made from these impressions are very much admired by dentists who happen to see them. The technic is simple, and any man who will acquaint himself with this system can take excellent impressions for either orthodontic work or for dentures, and will find it particularly valuable in partial cases. Dr. Angle's set of about eight trays are used by the orthodontists. These trays are highly polished, and should be kept in that condition. A good grade of plaster should be used, such as French's impression plaster, which can be procured in small tins or in barrels from any of the dental supply houses. In taking the upper impression the plaster is placed in the arch portion of the tray, with little or none upon the palatal portion, but a little excess upon the handle; the tray is placed in the mouth and allowed to rest upon the lower teeth while the plaster upon the handle is carried with the fore finger underneath the lips; then the tray is carried to position, and any excess passing over the back of the tray is immediately removed with a mouth mirror to prevent nausea. Wax, at the back of the tray as used by many men, is unnecessary. When the material has set sufficiently to break with a snap, the tray is removed, leaving the plaster in the mouth. Now perpendicular grooves are cut nearly through the plaster in the region of cuspids with a suitable instrument, and the centre or labial section pried away with the said instrument; the buccal portions are next pried off with the forefinger or thumb, and last, the palatal portion is removed. Horizontal grooves may also be cut where teeth are absent, to facilitate removal. These pieces are allowed to dry over night upon a blotter, then the broken edges are brushed with a camel's hair brush, to remove any fine particles adhering, and the parts put accurately together outside of the tray, and stuck with sticky wax. Any imperfections should be touched up with the same brush dipped in water and dry plaster. The impression should then receive a very thin coat of good shellac varnish, and after this has thoroughly dried a coat of thin sandarac is applied, when this is perfectly dry the model may be run with the same grade of plaster mixed with cold water.

The science of dentistry has made very rapid progress towards the ideal during the last ten to fifteen years, and the branch of orthodontia has not fallen behind in the race, chiefly due to the fact that in the early part of this period a well conducted school for the teaching of this subject came into existence. I refer to the Angle School of Orthodontia, at the head of which is a man who has given his whole time and energy to this

branch of dentistry for a quarter of a century. Scattered throughout the world to-day are about one hundred and fifty graduates of this school, most of whom are specializing, and the number is constantly increasing. Each of these men is adding more or less to the development of the science.

Most, if not all, the dental colleges, in America at least, have now a chair in orthodontia, but I doubt if any one of them devotes to the subject the amount of time which its importance demands; in fact, it seems almost impossible to-day for the faculty of any college to fully cover the whole subject of dental science in its present highly developed state. Not very many years ago a full dental course was covered in two years, and I venture to say that the time of the students in those days was not as fully occupied as it is now in a four years' course.

With the rapid development that has taken place in dentistry, how difficult it becomes for the average practitioner to keep up to the minute in all departments. It seems to me impossible, and I believe that the foremost men here to-day will agree with me when I say that possibly less than one per cent. of the dentists of the world, or in America if you wish, are in the front rank in every branch of the dental art. If we are agreed that this is a fact, then the day of the specialist is with us now.

During the past winter a session of Toronto Dental Society was devoted to papers dealing entirely with partial removable pieces. When I heard those essays, and examined the casts showing the different steps in the technic, I felt that the time was coming, if not already at hand, when in cities at least, prosthodontia might also be practised exclusively with advantage to both the operator and the patient. In fact, a number of men now are devoting their whole time to this work, and others again to the treatment of that most distressing pathological condition—pyorrhoea. It would seem as though this is the only practical way in which to advance the science to its greatest perfection. Of course, it is not possible for every man to specialize; those practising in small communities must do general work, but in the large towns and cities it is quite possible.

Orthodontia is decidedly different from all other forms of dental work, and the possibilities are so great, and the opportunities for thought and study so vast, that it is absolutely impossible for the general practitioner, who is now hopelessly overloaded, to accomplish the best results in the treatment of difficult cases at least.

If our patients are to receive the service to which they are entitled, then there must be more orthodontists—men who are specially trained and know its possibilities, and will give their whole energy to accomplish ideal results. Anything short of normal occlusion (except possibly in a few rare cases) will not prove satisfactory either to the patient or operator. I realize that a good many men before me to-day will say that I am a little extreme, but let me remind you that I did a general practice myself for eight years, and have now specialized for nearly five. I have seen the subject from

your standpoint, too, and it would afford me a great deal of pleasure if I could to-day convince you all of the honesty of my convictions, and of the truthfulness of the statements which I make in this paper, of which facts (for they are facts) you can all find proof if you will read the literature available upon the subject.

Now, I realize that you cannot believe all you see in print, but you may be able by careful reading to separate out the wheat from the chaff, and I would say that if we are to get as nearly as possible the truth of any subject we must take the opinions of the majority of recognized authorities, and not be guided by any one man's opinion, particularly if that man be one without reputation, like myself for instance.

Last year a paper upon orthodontia was read before the Ontario Dental Society, and if some of the advice given in that essay were followed, the final result after a few years' time would be so disastrous that it would be painfully evident to the dentist, the patient, and those coming in contact with the patient. The writer of that paper is a very conscientious dentist, and has the courage of his convictions, and is, perhaps, better posted than the average practitioner, particularly, I mean, in the work of orthodontia. In a short paper, such as the one to which I refer, it is impossible to go into the detail of treatment, but it is very unwise to advise extraction so ruthlessly as was done in that essay without at least stating the occlusion of all the teeth, as the relation of the teeth of one arch to those of the other governs very decidedly the treatment. I feel that it would be advisable to analyze carefully some of the statements made in the paper referred to, because lack of detail in a paper of this class may lead many a man reading it into error. It would be very dangerous to make such a superficial diagnosis of a case as many dentists would be inclined to do if they were guided by such a paper.

The essayist makes a very true statement where he says that "many dentists avoid this work, but when pressed to do something, where the erupting permanent teeth are crowded, they remove an adjoining deciduous tooth to make room, and the resulting condition is eventually worse than the first." But further on in his paper he advises the removal of permanent teeth, which extractions apparently relieve the crowding for the time being, but in many instances only result finally in a still greater crowding at another point. He cites a case of a patient of fifteen or older where a superior cuspid has crowded a lateral entirely within the arch. In this instance he advises the extraction of the lateral, and claims "the result justifies this extraction." Nothing is said as to the positions of the other teeth, or the relation of the uppers to the lowers. How dangerous it would be for any dentist to follow such advice, because he might err in diagnosis and perhaps extract, where the author referred to would not resort to mutilation at all. When such a condition as this exists in the upper arch, there is bound to be a crowding also in the lower, or else the

upper teeth are inclined to lock lingually with the lowers, and the removal of one from the upper arch will only hasten the inevitable—the dropping of the upper incisors inside the lowers. The final result is worse than the original condition; there will also be a decided lack of development of the nasal space, and what might have been a beautiful face will be marred for life. He says, “frequently the lower incisors are badly crowded, while the upper ones are in proper place and the posterior teeth in normal occlusion. The extraction of one of the crowded lowers will frequently relieve the trouble.” In such a case as this the lower incisors are very often lingual to their normal positions, and this arch or both are too narrow. The removal of a tooth from the lower in a case of this kind allows the remaining lower incisors to drop back still farther, and if the patient is a normal breather, the upper incisors will in time become crowded by the pressure of the lips, or if a mouthbreather, the lower lip will eventually rest under the upper incisors. Surely time will prove that this treatment was a failure. You do not, however, see this result at once; the crowded condition for a time may seem improved.

In this paper also is advocated the removal of the first premolars in cases where the cuspids erupt in labial or lingual occlusion. The essayist, however, says “that in these cases the ideal method would be to make room for them (the cuspids) by expanding the arch, but frequently good results can be secured by extracting the first bicuspid, which will relieve the trouble when the cuspid is erupting on the buccal side, by giving the needed room without deforming the face, and in many cases will ensure a better dentition than a crowded arch.” I presume he refers to the superior cuspids. Where these teeth erupt in this position the upper molars and pre-molars are usually in normal mesio-distal relation with the lowers, but both arches are too narrow and are under developed. One side only may be crowded in this manner, and if you remove a tooth from this side the median line of the upper teeth will shift very perceptibly and present eventually a disagreeable appearance. Later, as a result of decreasing the size of this arch, the lowers become crowded through the normal lip pressure. If the condition presents upon both sides, and both first premolars are extracted, the arch is so reduced in size that the action of the lips will either crowd the lower still more decidedly, necessitating eventually still further mutilation, or the upper incisors will drop inside the lowers. The method of extracting in these cases will perhaps, apparently, give an improved dentition, but examine the mouth a few years later, and you will change your mind. In these cases the arches should, as he says, be expanded. I cannot imagine extraction in any cases of this class being indicated, and only in, perhaps, extreme instances of poverty should a dentist resort to such an expedient, and I believe more harm than good will be the result eventually where such a course is pursued. If the lower teeth are in distal occlusion the width of a cusp in relation to the uppers,

and quite an apparent protrusion of the upper exists, then there might be some excuse for the general practitioner removing upper bicuspid. The effect upon the face, however, would not be ideal, but the occlusion and appearance might possibly be somewhat improved.

There can be no possible excuse for removing first molars at any age. If these teeth are lost before the second molars erupt, the development forward of the arches anterior to their positions will be stopped until the second molars catch up the space, and the effect upon the face will be very evident. I believe, too, that in a very small percentage of cases where these teeth are removed will the second molars come forward standing true. Dr. Johnston, of Chicago, addressing Toronto Dental Society recently, spoke very strongly against this practice. He said these molars were the "standard bearers of the dental arches." The first molars should always be saved if at all possible, and where they are past redemption, and have to be removed, the space should be retained until such time as it may become possible for the patient to have them replaced artificially. The lower first molars are more often lost than the upper ones, and the result is usually such a lack of development of the lower arch as to allow the lower lip to drop underneath the upper incisors, causing a very decided deformity. Once the lip commences to rest under the upper incisors, these teeth are gradually pushed forward, often to the extent that the person becomes positively ugly, the upper incisors as age advances elongating to a marked degree.

One of the constant causes of malocclusion is the loss of these molars, in so far as their absence, or even decided decay of their crowns, to say the least, results in a close bite. I believe many cases of malocclusion are the direct result of too close a bite. This is a feature of the subject to which I would like here to call especial attention, and would urge every man to watch for these close bite cases in the mouths of children, and insert where necessary a bite plane, made of vulcanite, to cover the palate like an ordinary denture, being built thick in front to catch the lower incisors, and thus allow the posterior teeth to elongate the necessary amount. Small clasps made of clasp gold should be imbedded in the vulcanite to catch over the incisal ends of the upper centrals. This appliance should be worn at least six months, depending upon the distance the bite has to be opened. The average child will become accustomed to it in a very few days; it should be worn always—most particularly while eating.

Suffice it to say that extraction in orthodontic treatment is a very dangerous procedure. It requires more skill in diagnosis to find a "short cut" than to carry out the ideal treatment. It is to be expected, then, that the general practitioner has developed this skill to a greater degree than the man who devotes his whole time and energy to orthodontia? Why will many men in general practice still continue to follow that antiquated

system in opposition to the opinions of recognized authorities on orthodontia?

Do the surgeons of to-day ignore aseptic precautions in their operations, since the advancement in medical science has taught them ways and means of preventing infection? Do we persist, also, in travelling by ox teams, when engineering skill has provided us with more rapid and practical means of transit? Does the skilled dentist now extract every tooth that is abscessed since the advancement in our knowledge has proven that these teeth can successfully be treated and filled? Then why will so many men persist in practising methods of bygone days in orthodontia, when all authorities tell us they are wrong?

It is a well known fact that Dr. Case, of Chicago, resorts to extraction under certain conditions, but if anyone will take the trouble to investigate thoroughly Dr. Case's methods, he will find that in not more than one instance at most, cited in the paper of last year, where the essayist advocates extraction, would Dr. Case resort to this expedient. So you will see how wrong it is to mutilate these dentures, having so superficial a knowledge of the subject, and justifying the action, perhaps, by the idea that such a man as Dr. Case resorts to this method. If any dentist seeking to do orthodontia will even acquaint himself fully with the methods of Dr. Case, he will find that there are only a very small percentage of cases, in Dr. Case's opinion, where a "short cut" may be taken by means of extraction. Then again, where there is one specialist practising the methods of Dr. Case, there are a hundred or more following that of Dr. Angle. Which would naturally seem to be the better method?

There are in Canada about eighteen hundred dentists, and these men are daily facing a large army of patients who are seeking advice as to the correction of irregularities of their dentures, and in the mouths of a still greater army, composed chiefly of children, are developing still more cases of malocclusion. It is this latter class which demands most particularly, I believe, the attention of the general practitioner.

If there is a very small percentage of cases where extraction is indicated even in the practice of the general dentist, in what way, then, can he be of assistance to his patients in the science of orthodontia?

In the first place he must know *occlusion*, as this is the basis of science. He should acquaint himself with the principles as practised by the leading men in orthodontia to-day. Any dentist who desires to be of real service to his patients in this department of dental science should possess a copy of Dr. Angle's *Work on Malocclusion*, and should study it thoroughly. He cannot successfully apply the principles set forth in this book until he has read it at least three times; in fact it should be studied very carefully, and I might say that in my experience it has proven very interesting reading. If a dentist does not desire to purchase a work devoted exclusively to orthodontia, then he certainly should at least have a copy of the

"American Text Book of Operative Dentistry," edited by Dr. Kirk, a new edition of which has just recently been issued. In this work will be found an excellent chapter on orthodontia, covering about two hundred pages, by Dr. Angle. This section of the work is carefully compiled and profusely illustrated, and covers, as fully as is possible in a book of this kind, occlusion, classification of malocclusion, facial art, etiology of malocclusion, the alveolar process and peridental membrane, the taking of impressions and making of models, regulating appliances, soldering, anchorage, adjustment and operation of appliances, treatment of cases and their retention.

This work also contains a splendid chapter on dental histology by another authority—Dr. Frederick B. Noyes. Dr. Noyes gives a clear and accurate description of the peridental membrane, a tissue which plays a very important part in orthodontic procedure. In this very full and up-to-date work on operative dentistry will be found, too, a valuable chapter by Dr. Alton Howard Thompson, upon Human Odontography, and one by Dr. Clark Goddard upon the management of "Deciduous Teeth."

Another excellent book covering general operative work is "The Text Book of Operative Dentistry," edited by Dr. C. N. Johnston. In this book will also be found a splendid chapter on orthodontia, also sections devoted to the other co-related tissues.

While passing, I would like to mention another work of great value to us all, and one which most of us possess, but which, perhaps, all do not study as they should; I refer to that little book on Dental Anatomy by Dr. C. V. Black. The facts set forth in this work are of greater importance to the man restoring lost tooth tissue and correcting irregularities than most of us realize.

The seeker after orthodontic knowledge will find in this issue of THE DOMINION DENTAL JOURNAL a paper by Dr. J. Lowe Young on "The Technic of Efficient Application of Fixed Appliances in the Correction of Malocclusion." This is one of the very best descriptions in short form of the use of the expansion arch that it has ever been my privilege to see. No one who adjusts an expansion arch can afford to be without a copy of this paper of Dr. Young's. I have intentionally omitted from my paper a description of this part of the work on account of this paper of Dr. Young's being of such excellence and so easily obtainable by all, and also the impossibility of covering so large a subject in a single paper.

Any man who will read the literature here suggested, and finds himself interested, can go still farther and follow the progress in the science of orthodontia if he will become a subscriber to "The American Orthodontist," a journal devoted exclusively to this subject. It is published quarterly by the Alumni Society of the Angle School of Orthodontia, and

contains, as well as special articles upon the newest achievements in orthodontia, the proceedings of that society. The subscription price for Canada is \$2.25 per annum; the business manager is Dr. Rolof B. Stanley, 11 East 48th Street, New York.

If every man who desires to fit himself to serve his patients intelligently along this line will do as I have suggested in the matter of reading, it will be entirely unnecessary ever again to have read before this society such a general paper as I have here presented upon the subject of orthodontia, but I venture to say there will be a keen demand for a more technical one.

However, I would like to set forth here what I consider the duty of the general practitioner in the matter of orthodontia, and show slides of a few cases which might very successfully be treated by him if he will acquaint himself with the subject, as he can by following the course of reading I have outlined, and also to show some slides of the type of cases which he should let severely alone. The more complicated cases give the specialist all the interest and variety he requires to keep him from inserting gold inlays and treating blind abscesses.

The first and most important duty of the general practitioner in the department of orthodontia is in the prevention of malocclusion. As I have already said, he should know occlusion, and should be able to detect irregularities which are developing in the mouths of his young patients. When the first permanent molars erupt sufficiently to come to a locking of their cusps—the upper with the lower, if the mesio-buccal cusp of the upper molar does not tend to drop into the buccal groove of the lower, then is the time for the dentist to commence his orthodontic treatment for that particular child. The disastrous results of the advice of dentists of bygone days to “wait until all the permanent teeth were in place” is surely sufficiently evident now in many adult mouths for us to resolve, if we have not all of us done so already, to try and forget that for so many years we displayed such ignorance, and seek, with our enlightened knowledge, to make amends for our errors. The time to correct any irregularity is as soon as a tendency to malocclusion manifests itself.

Occasionally, though fortunately not often, malocclusion occurs in the deciduous dentition. When such is the case it is usually the result of adenoids or enlarged faucial tonsils, and if these pathological conditions, as well as the occlusion, are not corrected there is sure to commence a malformation of the child face and subsequent malocclusion of the permanent teeth. Many of these cases have been corrected in the mouths of children as young as four years of age; I will show slides of such a case.

It is important that the dentist should observe the fact when a child is a mouth-breather from any cause, and explain to the parents the possible results of such a condition, and recommend the examination of the nose

and throat of the child by the family physician or preferably by a nose and throat specialist.

There are also a number of habits which cause malocclusion, such as thumb and finger sucking, lip-biting and tongue habits of various kinds. These the dentist should detect, and see that they are corrected. I will also show slides of some of these cases. Of course, we must get away from the habit of selling fillings and crowns, etc., or there will be no opportunity of giving sound professional advice such as is required in these cases and collecting a fee for valuable time spent in so doing.

When a child gets to the period when the lower permanent incisors are commencing to take the place of the deciduous ones, if nature has not supplied the developmental spaces, and there is apparently going to be a crowding, a very simple little appliance can be adjusted which will help the development and possibly prevent the inevitable malocclusion. This appliance consists of bands upon the lower cuspids, with short tubes upon their lingual surfaces; these tubes are so placed that a nickel silver wire of about 19 or 20 gauge can be adjusted straight across the arch close behind the incisors. This wire should be pinched with Dr. Angle's wire stretching pliers just sufficient to be "snug" about every two weeks. Do not make the mistake of tightening this wire too often, or too hard, as all that is required is a slight stimulus to bone growth.

I might state here that a great mistake is made by many men doing orthodontia of moving teeth too rapidly. The movement should not be faster than it is possible for nature to build bone. If this fact is remembered, there will be little or no soreness of the teeth during the process, and no reports of agony and sleepless nights of the children having the work done. Some patients will develop bone more rapidly than others, thus the desirability of correcting irregularities during the formative period. A young child will experience little or no inconvenience during orthodontic treatment if the work is intelligently done. Some men doing this work are inclined to tighten up appliances too often, and thus hurry the case faster than it is possible for nature to build the supporting structure. While this may have been considered good treatment in the dark days of the science, it is not so to-day; I see my patients, after the regulating appliances are adjusted, about once a week as a rule, and often do not tighten up anything upon these visits. A few years ago I tightened up appliances very slightly twice a week, but recent developments have shown that about once a week is sufficiently often. Dr. Angle's newest appliance is one which is intended to move the teeth bodily—crowns and roots, and is tightened up only about once a month. This latter appliance is one which will not appeal very strongly to the general practitioner, as it is not as easy of adjustment as the ordinary expansion arch.

The spring of the expansion arch, when intelligently applied, will develop the dental arches perfectly and leave no room for the use of the

cumbersome and old-fashioned jackscrew across the mouth—a barbarous appliance, for the use of which I have found no place in my practice.

The more simple cases, in the mouths of young children particularly, might very nicely be corrected ideally by the general practitioner, but I think he will be a happier dentist if he avoids the complicated ones. In fact, I believe if he will only study the literature upon the subject which I have suggested, he will then know his capabilities, and will be able to select the cases which he can intelligently handle better than I could possibly advise him in a paper of this kind.

With your kind indulgence, I will show a number of slides, most of which are cases in my private practice, but some have been very kindly loaned, and are very interesting slides illustrating beautifully some of the points I have sought to bring out in my paper. With the aid of these slides I hope to be able to give you a better idea of the effects of extraction than is possible in a paper, and at the same time make some suggestions as to the treatment.

Before proceeding with the presentation of the slides, Mr. President, I desire to say that I appreciate very much the opportunity of placing this subject before the members of the Canadian Dental Association, and I thank those present for the splendid hearing which has been given my humble effort. I would like particularly to thank the essayist of the paper upon this subject before the Ontario society last year for his courtesy. I realize that my paper falls far short of fulfilling the meaning of its title, but it would be impossible to cover so large a subject in an essay of this kind. I felt that by calling your attention to reliable literature, and where it could be obtained, I would be of more real service to you than by attempting any more than I have done here. I again offer my apologies for criticising another man's paper, but I know the author of that paper will realize that I have not done so for any personal reasons. If I have succeeded in arousing sufficient interest in the work to enthuse some of those present who are doing orthodontia to study the literature suggested, I will feel that I have accomplished all that I set out to do.

Dr. Young's paper, which appears on page 429, should be read in conjunction with the above article.

THE TECHNIQUE OF EFFICIENT APPLICATION FIXED APPLIANCES IN THE CORRECTION OF MALOCCLUSION

By DR. J. LOWE YOUNG, New York City.

Read before the American Society of Orthodontists at Boston, September, 1912.

Fixed appliances of different varieties have been in use a great many years for the correction of malocclusion, but previous to the systematizing and standardizing of these appliances into a few simple, practical and efficient forms by Doctor Edward H. Angle, their application was very complex, impractical and inefficient.

The forms which he advocated for the correction of malocclusion comprised chiefly the expansion arch and molar clamp bands, and the leading orthodontists of to-day are using these same simple forms for treatment of the simplest, as well as the most complex, cases of malocclusion.

Certain principles of fixation of appliances are involved in their use; first, the inherent power in the appliance to hold to the teeth, so that the patient cannot remove it, such as in the clamp band, and second, the use of phosphate cements to increase this holding power, as well as to prevent deterioration of tooth surfaces under bands, which otherwise would be possible.

With these general ideas of fixed appliances in mind, a description of these simple forms of fixed appliances, previous to the description of their efficient application for tooth movement, will not be *inapropos*.

CLAMP BANDS.

First in importance relative to the fixation principle, is the clamp band, which, by reason of the principle of the screw and nut, is mechanically most effective in being a "fixed" band, adding this power to that of the cement in holding to the tooth.

Clamp bands are furnished by the supply houses under the following designations: D, X, No. 1 and No. 2. The D band is used on the molars, and has a tube soldered to the buccal side to receive the end of the expansion arch. X bands are used on bicuspid, and also have a buccal tube. The No. 1 band is the same as the X band without the buccal tube, and the No. 2 band the same as the D band without the buccal tube. The D bands are made in three sizes: small, medium and large. In the proper adjustment of these clamp bands, and in their correct adaptation to secure greatest efficiency, it is desirable that the following successive steps be pursued:

To facilitate the adjustment of the clamp band it is advisable to get a slight separation, both mesial and distal (if there be a tooth distal) to the tooth which the band is to encircle. This may be done by passing a heavy

ligature wire through the interdental space, bringing the two ends together and twisting them tightly around the approximal contact points of the teeth to be separated. If this wire is worn for a few days there will be sufficient separation so that the band may be easily worked to place, except in some adult cases which may require some other method of tooth separation.

In these cases as well as in younger cases, ligature silk has been found very efficient for this purpose, and is used as follows: A double strand of fine floss silk, engaging a loop of ligature silk, No. 3, is passed by the

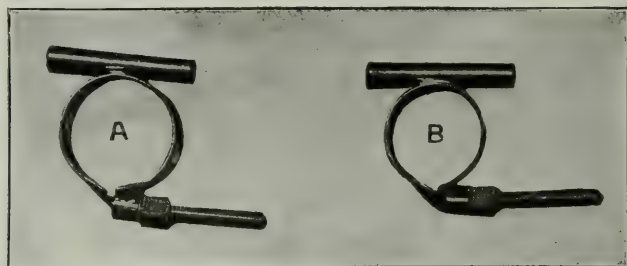


Fig. 1.

contact points, and the loop of the ligature silk is drawn through the interdental space to the buccal side, leaving the two free ends presenting ligually. The floss silk is then removed, leaving the ligature silk between the teeth. One end of the ligature silk is passed through the buccal loop, the other end is grasped and drawn taut, and the two securely tied to-

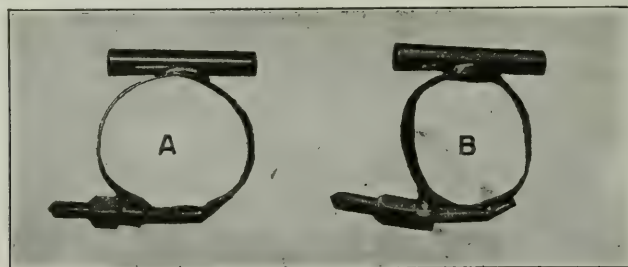


Fig. 2.

gether around the approximal contact points, clipping the surplus ends. Through the shrinkage of this silk ligature, sufficient space for the easy fitting of the clamp band may be obtained in any case.

TECHNIQUE OF ADJUSTING THE CLAMP BAND.

Fig. 1 represents a D band as supplied by the trade. If the nut of this band were loosened up sufficiently to allow it to be forced over the molar tooth, the edge of the band would impinge on the gum and cause unnecessary pain. To obviate this, the edge of the band that presents to the gingiva should be shaped as shown in Fig. 2, with a plier designed

for the purpose (Fig. 3), and the mesial portion of the band should be flattened in such a way that when forced over the tooth the lingual screw will lie very close to the lingual surface of the second bicuspid. A piece of dowel wood, shaped as in Fig. 4, is very serviceable in forcing the band to place without bending the edge of the band. As soon as the band touches the gum so as to cause any annoyance, it should be clamped on the tooth by turning up the nut with a suitable wrench, thus making the band conform somewhat to the shape of the tooth. The nut must now be loosened up sufficiently to allow the band to be carried well toward



Fig. 3.



Fig. 4.

the gingiva and then reclamped by turning up the nut.

The occlusal margin of the band should also be made to conform to the tooth, and the instrument (shown in Fig. 5), devised by the writer, has been found very suitable for the purpose. It has fine serrations on each of the two sides to prevent it slipping while pressing the band to place. The edges are left smooth, so that these parts of the instruments may be used as burnishers. This instrument is also very useful in removing various bands and in pressing plain bands to place when cementing them.

ADJUSTMENT OF BUCCAL TUBES.

The next step in the efficient adaptation of the clamp band is the determination of the position of the buccal tube. If this tube is not correctly placed it will be impossible to properly adjust the expansion arch. The proper location of this tube is of such great importance that it would

seem advisable that it should be sold separately, so that it might be soldered on after the band is fitted; for only in a small percentage of cases in which the tube is already attached will it be found to be in the correct position when the D band is properly adjusted.

Buccal tubes of some makes can be procured separately, but the best buccal tube for general use is that devised by Dr. Angle to accommodate the friction sleeve nut.

Wherever much expansion is required in the molar region, the buccal tube should be of such shape as to prevent the expansion arch rotating in them, thus obviating tipping of the anchor teeth (Fig. 6). The mesial end of the tube should be in such a relation to the band as to allow the nut on the arch to occupy the buccal embrasure between the anchor tooth and the tooth mesial to it, as in Fig. 7. If, for any reason, this is impractical, it is then advisable to solder the distal end of the tube to the mesio-buccal corner of the molar band, and thus bring the nut in the

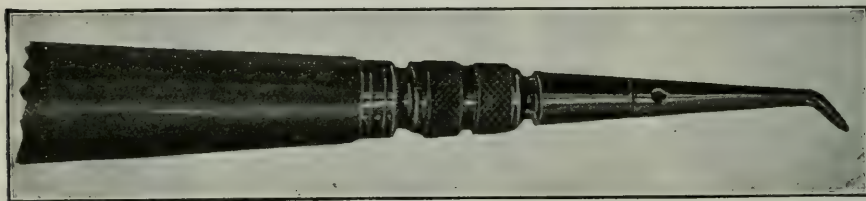


Fig. 5.



Fig. 6.

buccal embrasure one tooth mesial to the anchor tooth, as shown in Fig. 8, necessitating also the use of a shorter expansion arch.

The direction of the tube, with very few exceptions, should be such as to cause the arch when placed in the tubes to lie very close to, if not in contact with, the buccal surfaces of the teeth mesial to the anchor tooth. The directions of the tube on each band should so harmonize that when one end of the arch is inserted into the tube that is to receive it, the other end of the arch will lie on the same plane from both a vertical and horizontal view, with the tube of the opposite side, unless for some good reason, subsequently to be stated, a different position is advantageous. The tubes should be so placed that, with few exceptions, no bending of the expansion arch is required in order to have it assume its proper position in the anterior region, i.e., at the gingival border (Fig. 9).

Where the anchor bands are fastened to the first permanent molars and the deciduous cuspids and molars are in place, it frequently happens

that in order to prevent the expansion arch from impinging on the gum tissue the direction of the buccal tubes must be such that it will be found necessary to bend each lateral half of the expansion arch just distal of the cuspids, in order that the front portion of the arch may assume its proper position in the incisor region.

In order to place the buccal tubes as stated above, the band must be unclamped, the tube unsoldered, and resoldered in the desired position. The band must then be reapplied and reclamped to be certain that the position of the buccal tube is correct. If found so, the band must now be

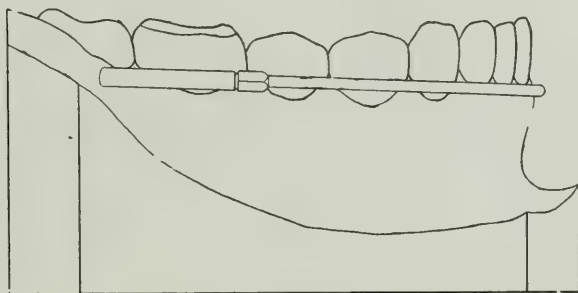


Fig. 7.

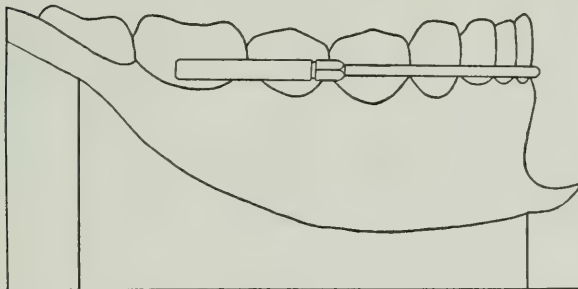


Fig. 8.

removed and the tooth thoroughly polished, so as to free it from all deposits and secretions.

CEMENTATION OF CLAMP BANDS.

The band may then be cemented on the tooth and securely clamped. As a cementing medium, Evans' Orthodontia Gutta Percha has been found very advantageous, as it is not necessary to have the tooth dry, and there is absolutely no danger of the gutta percha dissolving out.

If a zinc phosphate is to be used for cementing these bands in place, a semi-hydraulic cement should be selected. In using such a cement it is not necessary to have the tooth perfectly dry; in fact, the cement will be stronger and better if there is a slight moisture on the tooth. However,

cement cannot be depended on to adhere to a tooth from which all mucus has not been removed.

The cement is mixed by first pouring out the required quantity of liquid on the glass slab; a small portion of powder is added to this liquid from the bottle, by rolling it between the thumb and finger. This powder should be thoroughly mixed with a suitable spatula before any more powder is added. The longer this mixing process is continued up to one minute, the slower the cement will set. Then little by little more powder is dusted out of the bottle and thoroughly spatulated until the proper consistency is attained. At this point of the procedure the tooth should be sprayed with some alkaline solution, and the patient instructed to rinse the mouth with an alkaline solution. This part of the work should be attended to by the assistant. The band is now filled with this cement, and the occlusal orifice of the band closed either with the finger, or better, a piece of No. 60 tin foil. This causes the surplus cement to escape from

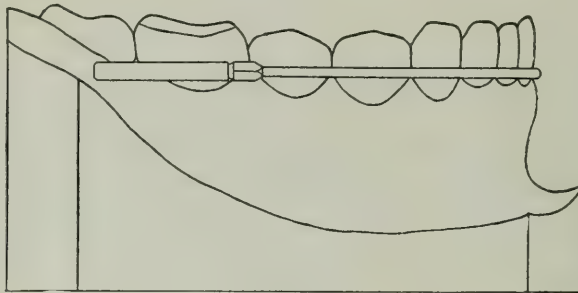


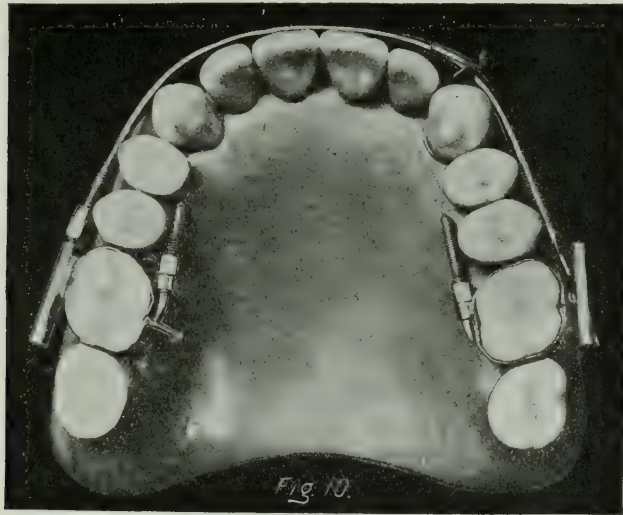
Fig. 9.

the gingival orifice of the band, and removes considerable of the moisture, leaving just the amount required by such a semi-hydraulic cement.

The band on the opposite side is now adjusted in like manner. By means of the expansion arch the direction of the buccal tube is now determined. This is done by inserting one end of the expansion arch into the buccal tube of the cemented band, and holding the other end of it in its proper relation to the teeth on the opposite side, and noting the relation this end of the expansion arch bears to the buccal tube that is to receive it. If found, as in Fig. 10, and resoldering of the buccal tube is neglected, when the arch is sprung into position, it is inevitable that the molar on this side will be rotated. In some cases the buccal tubes can be readjusted without soldering, by using an instrument devised by Doctor Josef Grunberg, and shown in Fig. 11. When this tube is so adjusted that the arch will lie on the same plane with it from both a vertical and horizontal view, the band is ready to be cemented in place. It is always well to mark one end of the expansion arch in some way, so that it can be placed in the same tube each time.

TECHNIQUE OF ADJUSTING PLAIN BANDS.

As it is found necessary to fit a number of plain bands, it is desirable that the material for these bands should be as thin as possible, and yet be stable. Platinum and iridium, ten per cent. of the latter, has been found by a great many to be the most desirable metal for this purpose. It may be used as thin as .002 of an inch. Some operators have condemned this material on account of being too stiff. This stiffness can be overcome by annealing the roll of band material in an electric furnace. Fifteen-hundredths of an inch in width is a very serviceable size. Before shaping the band, one side of the strip of metal should be roughened by drawing it over a round file. The strip with the roughened side presenting inward should next be worked carefully around the tooth and well burnished to the



lingual surface. It is then held with the thumb and finger and pinched with a suitable plier, so as to make it conform accurately to the shape of the tooth. After it is soldered in the usual way, a spur should be attached, as desired, for the case in hand.

The wire to be used for making such a spur should be as light as possible, and never should be heavier than the heaviest ligature wire, and if made from fifteen per cent. platinum and iridium, it can be lighter than this heavy ligature wire. Care should be exerted in placing the spur so that when the ligature passes from the spur to the expansion arch, the tendency will be to withdraw the tooth from the socket rather than to depress it therein. Bands of such thickness are so flexible that when soldered with real gold they can be made to fit very closely nearly all of the ten anterior teeth in each arch. In fitting bands to partially erupted cuspids, it often becomes necessary to crimp the band by pinching on

both the mesial and distal portions, in addition to the regular lingual pinch usually required on a cuspid band. Bands for the upper laterals usually require a small pinch at the disto-incisal angle. Where such extra crimps are necessary, solder should be used to unite the pinched surfaces, and the surplus material trimmed away, and the ragged edge filed and polished. After the tooth to be banded is cleaned and polished, and the cement is prepared as described above, the band is filled with the cement and forced over the tooth. The lingual surfaces of the bands on each anterior tooth should be accurately burnished, so as to leave as thin a layer of cement between the bands and the tooth as possible. This is for a double purpose, first, so as to lessen the probability of the lower teeth wearing through the bands on the upper anterior teeth; second, so as to force the cement around the approximal portions of the tooth, where it may have been forced out by the band passing over the contact points. After this burnishing, the band should be forced to its final position, with a suitable driver by first pressing it on the lingual side of the band and then on the labial, using also light taps of the mallet to secure perfect adaptation.



Fig. 11.

BANDING BICUSPIDS.

For some years I have been rotating bicuspid just as soon as the two cusps are through the gum. It is not an easy matter to pinch a band on a bicuspid in such a condition, but I have obviated the necessity of pinching the band in such cases by having previously made up a number of plain bands, varying in size two-hundredths of an inch in circumference. These bands I have in stock and properly labeled, ranging from eighty-hundredths of an inch to one hundred and ten hundredths of an inch in circumference. When a case presents with a bicuspid, as described above, I select the size band I think will encircle the tooth. If, upon trial, it is found too small, a larger one is selected, and so on, until the correct size is obtained. In this way I find I can band such teeth without causing any pain, and it has also been found that a very few weeks of gentle force causes these teeth to rotate without any trouble at all, and also that two or three months' retention of teeth so rotated is sufficient. Two or three years of retention is not always sufficient when rotation is begun after root and bone are fully developed.

DEGREES OF FORCE IN THE EXPANSION ARCH.

Before considering in detail the application of the expansion arch, it becomes necessary first to designate the degrees of lateral spring force applied to the anchor teeth through the expansion arch, so that an intelligent use of this force may be comprehended. This lateral spring pressure on the anchor teeth may be denoted as follows:

A—Denoting passive condition; i.e., when in position the expansion arch exerts no lateral force.

AL—Denoting lingual force; i.e., when in position, force is exerted lingually.

AB—Denoting buccal force; i.e., when in position, slight force is exerted buccally.

AB2—Denoting greater buccal force than indicated by AB.

AB3—Denoting greatest buccal force.

Comparing the relative spring pressure of spring gold and German silver, the following caution should be observed:

Where spring gold is used for the construction of the expansion arches, and great haste is not desired, it is never necessary to put more expansion in an arch than is necessary to move the teeth the required distance. Where base metals are used in the construction of the arch, it often becomes necessary, at the beginning, to put more expansion in the arch than the distance it is expected to move the teeth.

Now, for the sake of simplicity and clearness of description, the application of the expansion arch will be considered under several headings, corresponding to the various tooth movements necessary to accomplish, taking up first the simple labial movement of the incisors, and then various combinations of tooth movements found necessary in everyday practice.

1. *To Move the Incisors Labially.*

This can only be accomplished without carrying the anchor teeth buccally or lingually, by so placing the tubes on the anchor bands that they are parallel with each other. This necessitates a sharp bend (Fig. 12) in the expansion arch just in front of the nuts, in order that the arch may lie close to the cuspids and bicuspid, and not interfere with the soft tissues. The arch must be bent, so as to pass into the tubes without exerting any lateral spring, denoted Exp. A. When one end of such an arch is inserted into the tube on the anchor band, the other end should lie parallel, when passive, with the tube that is to receive it. The incisors to be carried forward are ligated to the arch, and as the nuts are turned up, this movement is accomplished.

If the incisors are inlocked, or the molars are not sufficiently fixed to resist such pressure without tipping distally, as sometimes happens in Class II., Division 2, it is advisable to solder hooks on the arch in front of the nuts, and from these use intermaxillary rubbers on each side to

hook well forward on the lower expansion arch. In this way the molars can be left undisturbed, and they will be more useful as anchorage when shifting the lower teeth forward.

2. *To Move the Incisors Labially, and the Cuspids, Bicuspid and Molars, Buccally.*

In order to accomplish this, it is only necessary to so shape the expansion arch that when the labial and buccal surfaces of the teeth are brought in contact with it, they will have assumed the desired position, or the shape of the ideal dental arch.

This is so simple that it would seem impossible for anyone to meet with any difficulty, *but it is rare, indeed, for a beginner to properly adjust an arch for such a purpose.* The tubes on the anchor bands must be so placed that when one end of the expansion arch is inserted in the tube,

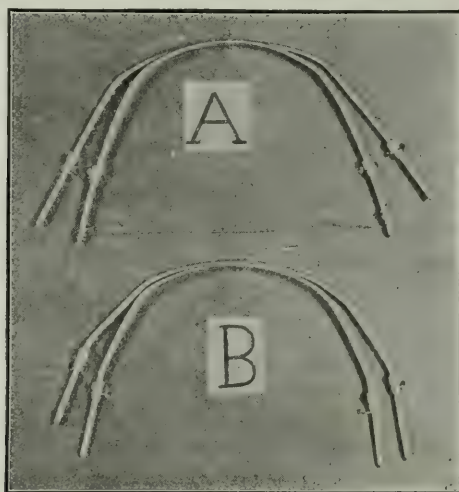


Fig. 12.

the other end would, when passive, lie on the same plane, from both a vertical and horizontal view, with the tube which is to receive it. If the dental arch is to be lengthened to any extent, which is done as in No. 1, it will also cause expansion in the region of the anchor teeth. Failure to realize this fact is responsible for over expansion in the molar region.

3. *To Move the Incisors Lingually, and the Cuspids, Bicuspid and Molars Buccally.*

This movement is often required on the upper arch in the treatment of Class II, Division 1. The adjustment of the tubes on the anchor bands, and the shaping of the expansion arch, should be the same as in No. 2, having Exp. AB2. On trial, on the model, it will be found, when passive, to stand some distance from the cuspids, bicuspid and molars. When

this expansion arch is inserted, it should stand away from the cuspids and bicuspid, and should be ligated to these teeth first. If the arch is not too heavy (.038 inch is sufficient), it can be brought in contact with these teeth, and will be carried away from the incisors. The nuts should now be loosened, so that the arch may be forced back until in contact with the incisors. If any of these are to be rotated they should be properly ligated to the arch, otherwise no ligating of the incisors is necessary. As the cuspids, bicuspid and molars on each side are carried buccally by the spring of the arch, the incisors will be carried lingually. An expansion arch so applied is practically automatic, and may be allowed to go a month without attention. If nothing breaks, the worst that can happen is to carry the incisors too far lingually, and this can be readily counteracted by turning up the nuts on the arch. Note how the force is reciprocated from one side to the other, and also to the anterior teeth.

4. *To Move the Cuspids, Bicuspid and Molars on One Side, Buccally.*

Usually when such a movement is necessary in either dental arch the malposed teeth are inlocked by those of the opposing jaw. In order to overcome this inlocking without displacing the teeth on the opposite side, some precaution is necessary. It is obvious that it will not do to depend on the reciprocal force of the expansion arch, as in No. 3. The attachment to the teeth on the normal side should be as nearly stationary anchorage as possible.

This may be accomplished in various ways, but the one here described seems the most applicable. The cuspid on the normal side is fitted with a plain band, and a rigid wire is soldered from the end of the screw of the clamp band to the cuspid band. This necessitates care being used while cementing these bands in place, but the cuspid tooth being easy to fit, there will be little danger of the band coming loose. The buccal tube is so shaped that the expansion arch cannot rotate in it, and should be so placed on the band that the expansion arch will lie close to the bicuspid and cuspid on the normal side. The other end of the expansion arch should lie on the same plane, from both a vertical and horizontal view, when passive, with the buccal tube, which is to receive it, and should stand away the distance it is necessary to move the malposed molar buccally.

The arch is then inserted into the tube, with the nut so placed that the arch lies very close to the incisors. As the inlocked molar moves buccally, the nut on the arch on this side should be turned up from time to time, so that the arch does not press on the incisors. If this end of the arch should tend to slip forward out of the buccal tube, it can be prevented by the adjustment of a rubber ligature over the back end of the tube and over a small hook soldered on the arch in front of the nut. When the molar reaches its proper position the second bicuspid may be ligated to the arch, and so on, one at a time, until all the malposed teeth

are brought into proper position. In this way, it will be seen that four teeth on the normal side, two of which must move bodily if they move at all, are pitted against the inlocked molar. Subsequently, this molar can be straightened up by the proper application of retaining appliances.

Further reinforcement of this anchorage can be obtained by the use of intermaxillary rubbers on each side (Fig. 13).

Fig. 14 shows profile views of a case requiring such application of appliances. Fig. 15 is a front view of the same.

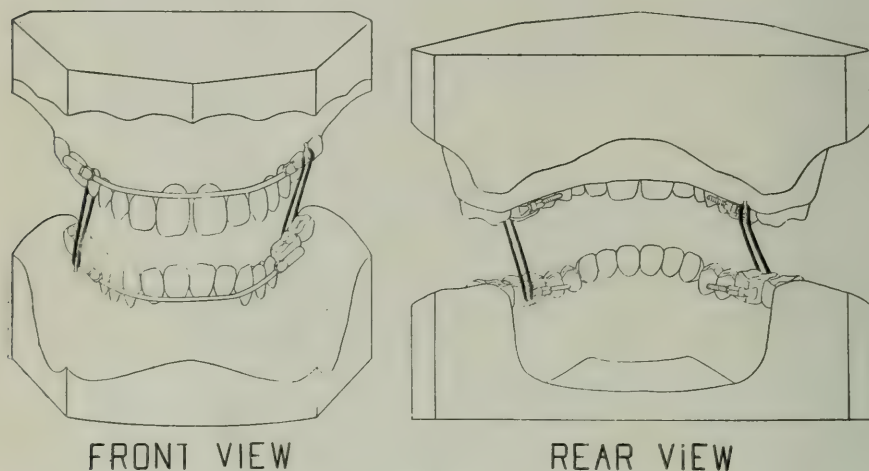


Fig. 13.

5. To Move the Cuspids and Bicuspid's Buccally on Each Side.

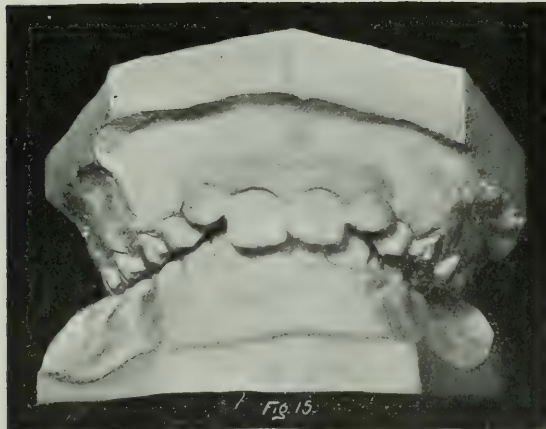
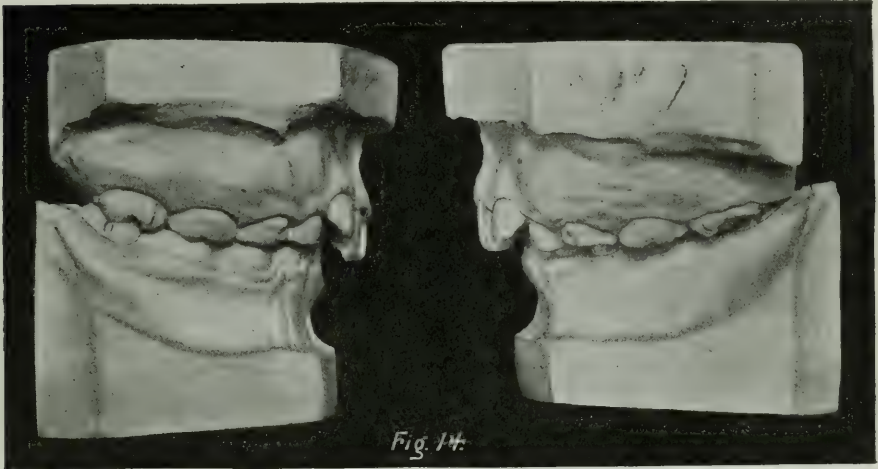
This can be accomplished without disturbing the other teeth, by so placing the buccal tubes, that when the expansion arch is inserted it will rest passively in them. The expansion arch should be of the shape and dimensions that the dental arch is to assume. It will thus be found to be some distance from the malposed teeth. By use of silk ligatures these teeth can be caused to move buccally until they come in contact with the expansion arch. Or, if a light expansion arch is used, it might be ligated with wire, so as to rest in contact with the cuspids and bicuspid's, and thus obviate interference with the soft tissues.

This necessitates the turning back of the nuts on the expansion arch, the front portion of which should be allowed to approximate the incisors. As the malposed teeth move buccally, these nuts should be gradually turned up to prevent carrying the incisors lingually.

Obviously this would cause some temporary displacement of the anchor teeth. To prevent this, the expansion arch should have Exp. AB at the beginning, and when the cuspids and bicuspid's begin to move, it should be reduced to Exp. A.

6. *To Move the Incisors Lingually and the Cuspids and Bicuspids Buccally.*

In order to do this without disturbing the anchor teeth, if for any good reason the first molars are to be used as anchorage, it is advisable to have a swivel attachment of the buccal tubes to the anchor bands, which will be described under the heading, "Rotating of Molars." The simple



way to bring about such a movement is to use X bands on second bicuspids and treat as in No. 3.

7. *To Elongate Bicuspids.*

This can be accomplished by use of an auxiliary spring soldered well to the distal end of the buccal tube, allowing it to pass forward occlusally of the expansion arch. With the expansion arch in place, and properly ligated to the cuspids and incisors, this spring is ligated to the bicuspids

in infra-occlusion. It is usually well to band these teeth so that the ligatures may be attached to proper hooks (Fig. 16). Fig. 17 shows application of a light arch, as described by Dr. Case, to accomplish these same tooth movements.

Fig. 18 shows profile and front view of a case requiring such treatment. Fig. 19 the same after treatment. Fig. 20 is the profile and front view of the face before treatment, and Fig. 21 the same views after treatment.

8. To Elongate Anterior Teeth.

Infra-occlusion is found in various sections of the dental arch. In this connection infra-occlusion refers to teeth that are so placed that it is impossible for them to be brought in contact with the teeth of the opposing dental arch. The incisors are more often in infra-occlusion than the other teeth, and the upper incisors more often than the lower ones. Where both

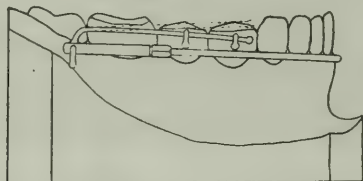


Fig. 16.

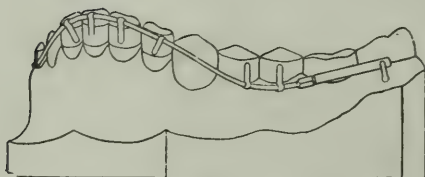


Fig. 17.

upper and lower anterior teeth require elongating, the application of inter-maxillary rubbers is of great assistance.

The teeth to be acted on should be fitted with bands which have on their labial surfaces suitable spurs to engage the arch, so that it cannot be moved toward the incisal edges of the teeth when the mouth is open and the rubbers put on stretch. These rubbers should be applied in a triangular way. To accomplish this, spurs are soldered to the upper expansion arch in the region of the distal surface of the upper lateral incisors. These spurs point towards the gingiva. On the lower expansion arch spurs are also soldered pointing towards the gingiva, and may be placed directly under the upper spurs, or either mesial or distal to this point, as desired.

The arches are adjusted so that when passive they will rest just above the spurs on the anterior bands. If such an arch is sprung so as

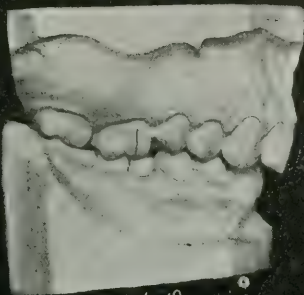


Fig. 18

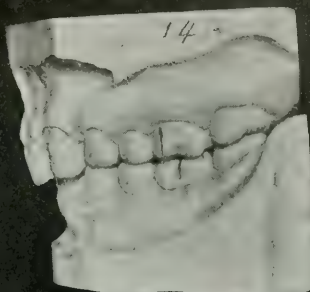


Fig. 18

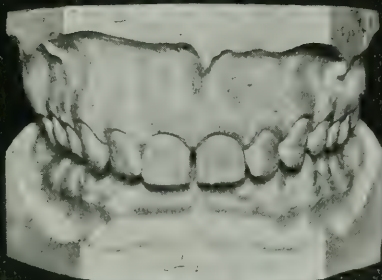


Fig. 18

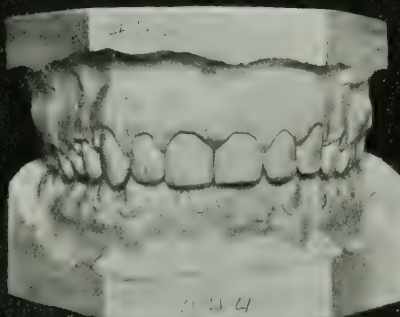


Fig. 18



Fig. 19

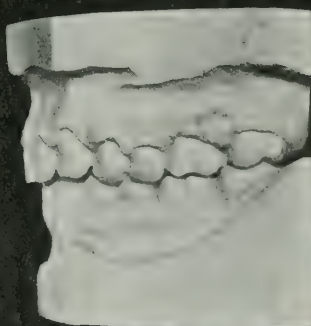


Fig. 19



Figs. 20 and 21.

to rest below these spurs (*i.e.*, gingivally), the tendency will be to tip the molars mesially and elongate the anterior teeth. Sometimes it is advisable to have swivel attachments of the buccal tubes to the clamp bands and then, by use of intermaxillary rubbers, the molar tipping can be obviated.

Where the lack of vertical development is confined to the anterior teeth in one dental arch, the rubbers should not be worn. The tooth on each side most mesial, and not in infra-occlusion, should be banded and a wire soldered from it to the screw of the clamp band, as described in No. 4. This prevents forward tipping of the anchor teeth, and permits the expansion arch, which should be as light and elastic as possible, to spring from the front end of the buccal tube on each lateral half to the point where it engages the spur most distal. Owing to the length of spring thus obtained, the delicacy of adjustment is much greater and the efficiency increased.

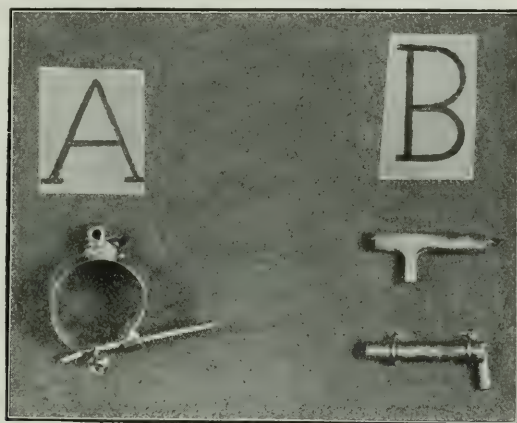


Fig. 22.

9. *To Rotate the Anchor Teeth Causing the Disto-buccal Corners to Move Buccally.*

It is rare indeed to find the first molars, either upper or lower, requiring such a movement. When desired, it can easily be accomplished by so placing the buccal tubes on the anchor bands, that when one end of the expansion arch is inserted in the tube, the other end of the arch, instead of being on the same plane with the tube, from a vertical view, presents buccally towards its distal end. If both molars are to be equally rotated, the arch should be removed, and the end that was free in the first trial inserted in the tube on the opposite side.

The end that is now free should bear the same relation to the tube that is to receive it as the first one did. When the arch is inserted, it should stand away from the bicuspid on each side, and as the distal ends of the arch are caused to spring lingually they exert a constant outward

pressure, and thus rotate the molars. If necessary, by ligating the arch to the bicuspid on each side, the pressure on the molars can be increased and the rotation hastened.

10. *To Rotate the Anchor Teeth Causing the Disto-buccal Corners to Move Lingually.*

This movement is very often required in order to establish occlusion, and unlike No. 9, is often very difficult to accomplish. In young patients it can usually be done by putting a sharp bend in the expansion arch just in front of the nuts, causing the distal end of the arch to present lingually. (B Fig. 12.) An arch so shaped tends to work out of the tubes, and, if not ligated to the anterior teeth, it should be held in place by means of a rubber ligature on each side, as described in No. 4.

In older patients, and especially where the tooth mesial to the molar to be rotated has been lost, other means must be resorted to. The D band,

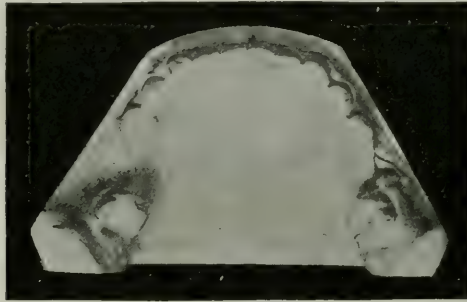


Fig. 23.

with the screw directed distally, is fitted to the molar to be rotated. It is then removed, the buccal tube unsoldered, and to this band is soldered a suitable round tube in such position as to lie over the mesio-buccal corner of the tooth, and be parallel with its long axis when the band is cemented and clamped in place (Fig. 22a). To the buccal tube is soldered a suitable wire in the desired position (Fig. 22b), in such relation that when it is passed into the tube on the band the buccal tube will assume the proper position to receive the expansion arch, giving a hinge attachment between the arch and the band.

Where the tooth mesial to the molar to be rotated is missing, as in Fig. 23, a suitable hook can be soldered to the expansion arch in such a position that a rubber ligature can pass from the screw on the molar band to this hook without exerting pressure on the tooth in front of the space. If this arrangement is used on each side it will be observed that we have established reciprocal force to rotate these teeth, and it is doubtful if any tooth can resist this constant pull of rubber.

Where no tooth is missing, a suitable wire of spring gold can be soldered to the molar band in such a position as to present lingually as it

passes forward in the bicuspid region. This may now be ligated to the expansion arch, and caused to lie in contact with the bicuspids. From time to time, as the ligature is renewed, this lever may be bent linguallly before the new ligature is applied.

11. *To Move the Upper Incisors Linguallly.*

The adjustment of the buccal tubes and the expansion arch should be the same as in No. 1; except that the sharp bends in the arch should be some distance forward of the nuts. Owing to the fact that teeth move forward so much more easily than they move backward, it becomes necessary to resort either to occipital or intermaxillary anchorage. If the latter is employed, the lower expansion arch should be adjusted in such a manner as to establish, as nearly as possible, stationary anchorage. This will be described later.

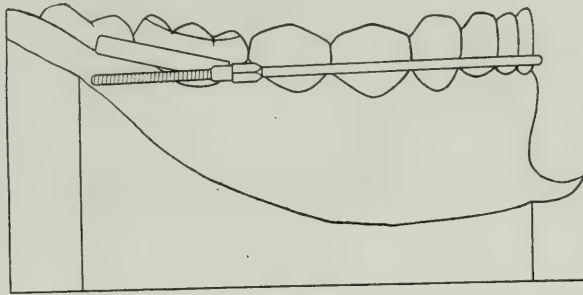


Fig. 24.

12. *To Move Molars and Bicuspids Linguallly.*

While this movement is not often required, it has been considered difficult to accomplish, but this is not so, if the spring of the expansion arch is combined with the constant pull of rubber. A stiff arch should be employed, and should be so shaped that in order for it to be inserted into the buccal tubes it must be sprung buccally. Such an arch will always tend to move forward, unless ligated to the anterior teeth. To do this is a mistake, unless the incisors are to be moved labially or rotated. The expansion arch should be held in place, *i.e.*, so as to press against the buccal surfaces of bicuspids, by rubber ligatures, one on either side, passing from suitable hooks attached to the expansion arch over the distal ends of the buccal tubes.

If it is desirable to move these teeth bodily, it can be done by using the elliptical tube on the anchor band, and a plain band on the first bicuspid, uniting the two by soldering a piece of stiff wire from one to the other on the lingual side, as described in No. 4. If this is done on either side, and the arch inserted and worn long enough, the teeth will be carried bodily linguallly.

13. To Straighten up Molars Tipped Mesially.

If but one molar is tipped, the tube on the anchor band for the normal side should be placed in the usual way. The other should be so attached to the anchor band that when the expansion arch is inserted in the tube on the normal side, the other end of the expansion arch should be on the same plane with the tube that is to receive it, *from a vertical view*, but from a horizontal view the mesial end of this tube should present toward the gingiva (Fig. 24). If this arch is now sprung in place the

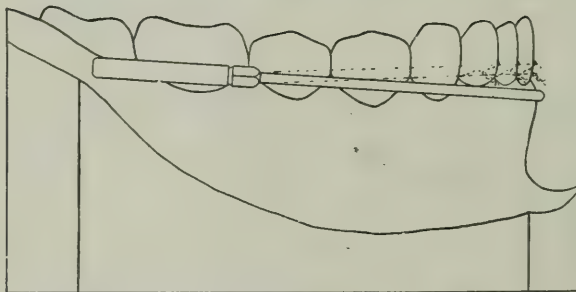
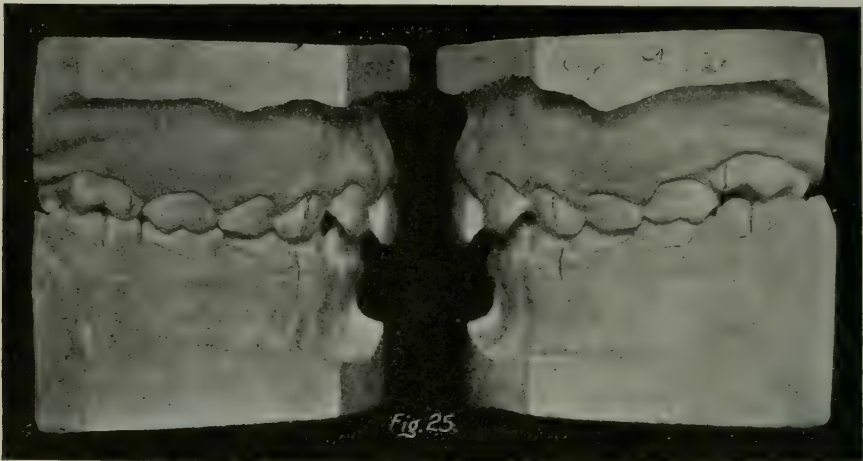


Fig. 26.

tendency will be to tip mesially the normal molar, and at the same time straighten up the tipped molar. Owing to the difficulty of depressing teeth in their sockets, the normal molar scarcely moves at all, and the tipped one is made to assume its normal position. Fig. 25 shows a case requiring such treatment.

When a molar on each side of the same dental arch is tipped the tubes should be placed so that when the arch is inserted the front portion will lie, when passive, at least one-eighth of an inch below the gingival border (Fig. 26). This arch should then be sprung to the proper position

and firmly ligated to the cuspids or incisors. This will tend to tip the molars back, and at the same time depress the anterior teeth. The latter movement will be so slight, however, that it will not be noticeable, and as soon as the pressure is removed they will readily return to their former positions.

This manner of adjustment is also used to create stationary anchorage on the lower dental arch where desired, but in such cases the expansion arch, when inserted into the tubes, should lie, when passive, closer to the gingival border of the anterior teeth than where it is desired to tip the lower molars distally.

14. *The Adjustment of the Arches and the Application of Intermaxillary Rubbers in the Treatment of Class II., Division 1.*

It is always advisable to have both expansion arches in place when intermaxillary force is to be applied. Two methods may be employed, according to the movement required.

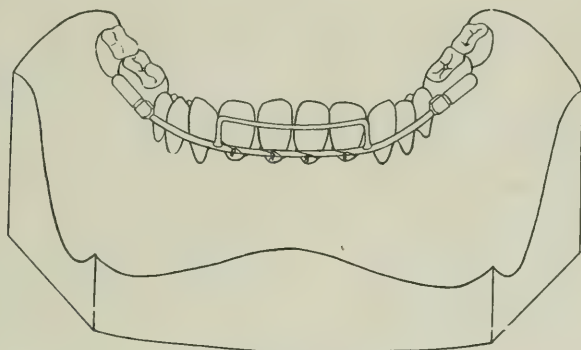


Fig. 27.

Where it is thought advisable to tip the molars distally, so as to place the inclined planes of these teeth in harmony with the molars on the opposing jaw, the expansion arch is adjusted in such a manner that as these teeth are tipped distally they will be in proper relation mesio-distally with the lowers.

The upper arch should have suitable hooks, so placed that when the arch is inserted they will be on a line with the distal surface of the upper laterals. Over these, rubber ligatures are passed to the distal end of the buccal tubes on the lower D bands. One rubber on each side is sufficient at the beginning, and if more force is required later the number of rubbers may be increased.

As the molars tip distally, the arch will require lengthening by turning up the nuts, so as to keep the front portion of the arch free from the incisor teeth. It will also be found necessary either to readjust the tubes on the anchor bands, or to put a bend in the arch on either side, so that the front section will be in proper position on the anterior teeth, which

is at the gingival border. The lower arch is adjusted, as previously described, to create stationary anchorage.

This method of treatment depends very largely on efficient retention of the molars to carry the lower teeth forward as they gradually assume their upright positions.

The other method is to bring about a mesial movement of the lower teeth, without tipping the upper molars distally. To do this the upper expansion arch should be adjusted as in No. 3. The lower expansion arch may be used as has been described, or one or more of the front teeth may be ligated to the arch and moved forward, by turning up the nuts on the arch, then, according to the case, two or more teeth may be ligated, and so on, until all the lower teeth are carried forward to their normal positions.

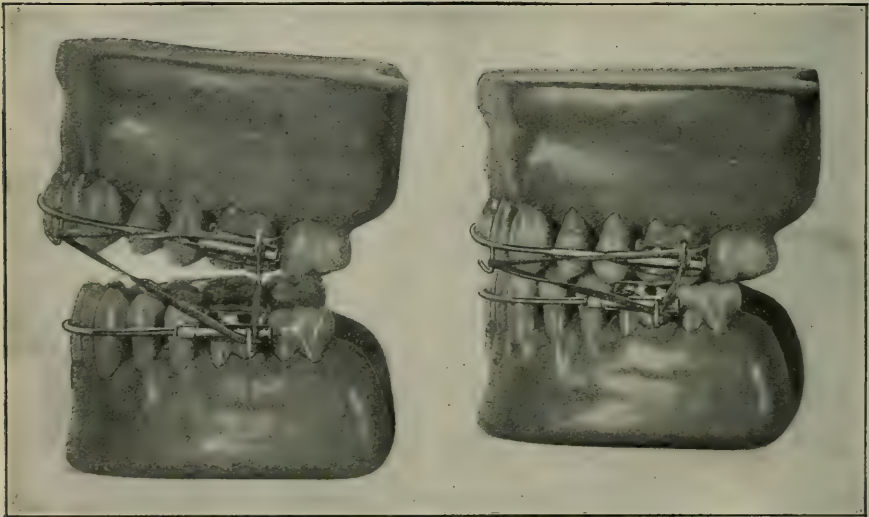


Fig. 28.

An auxiliary wire soldered to the front portion of the lower expansion arch, so as to engage the labial surface of the incisors and cuspids, close to the incisal edge, has been found of value to prevent tipping of these teeth in their forward movement (Fig. 27). This wire should be of spring metal, and not over .030 of an inch in diameter, so that it may be occasionally bent in such a manner that the arch will stand away from the labial surface on the incisors and cuspids, when the auxiliary wire is in contact with the teeth.

In the treatment of a sub-division of the First Division of Class II., the intermaxillary rubber should be worn on but one side, and may be adjusted according to either method just given for the treatment of the full division.

15. *The Adjustment of the Arches and the Application of Intermaxillary Rubbers in the Treatment of Class II., Division 2.*

As these cases usually require that the lower bicuspid and molars be elevated, it becomes necessary to use a bite plane of some description, so as to prevent the back teeth from meeting when the jaws are closed.

As in No. 14, two methods may be employed, but the distal tipping of the upper molars in this case is far less indicated than in the treatment of the Division I. It is preferable to use intermaxillary force, as stated in No. 1, to move the upper incisors forward, and later reverse the application of the intermaxillary elastic so as to carry the lower teeth forward, and at the same time elevate the bicuspid and molars.

This can be done by soldering suitable hooks on the upper buccal tubes, so that the intermaxillary rubbers can be applied in a triangular shape; *i.e.*, to pass from the hook on the arch in the lateral region to the hook on the buccal tube on the upper, and then over the distal end of the buccal tube on the lower on each side (Fig. 28). If necessary to increase the intermaxillary force, a second rubber may be employed on each side, but in the usual way; *i.e.*, from the hook on the upper arch over the distal end of the buccal tube on the lower. When two rubber ligatures are worn in this way, the one from the lower to the upper should be put on first. If this is not done the rubber ligature, worn in the triangular shape, is very liable to break.

The next six figures show a case of this kind treated as described above. Fig. 29 shows profile and front view of models of the case before treatment; Fig. 30, occlusal view of same; Fig. 31, profile and front view when retention was applied; Fig. 32, occlusal view of models at this time; Fig. 33, profile and front view of face before treatment, and Fig. 34, same view after treatment.

In the treatment of a sub-division of this class, it is only necessary to apply the rubbers on the side that is abnormal.

16. *The Adjustment of the Arches and the Application of Intermaxillary Rubbers in the Treatment of Class III.*

In order to prevent, as much as possible, in these cases the labial tipping of the upper anterior teeth in moving them forward, an auxiliary wire should be soldered to the front portion of the arch, as described in No. 14. In pronounced cases of this class it will sometimes be necessary to elongate the anterior teeth as they are carried forward.

The application of the lower arch should be such as to embrace, as nearly as possible, all the lower teeth as a unit of anchorage, but it is impossible to establish stationary anchorage to the same degree as where intermaxillary force is applied in the opposite direction.

To accomplish this the lower cuspids are banded, and to these is soldered a labial wire. On this labial wire are soldered four small

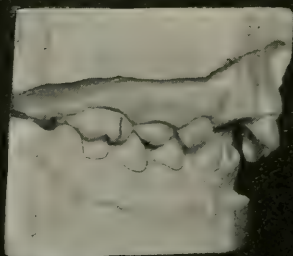


Fig. 28

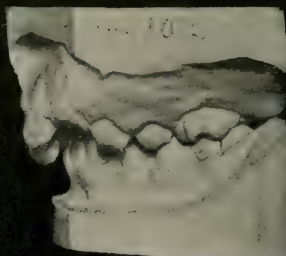


Fig. 29

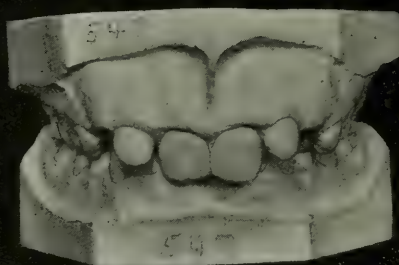


Fig. 29

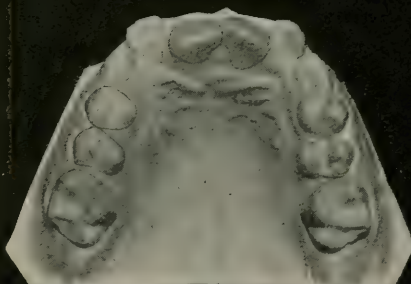


Fig. 30

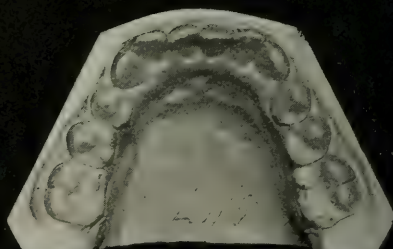


Fig. 30

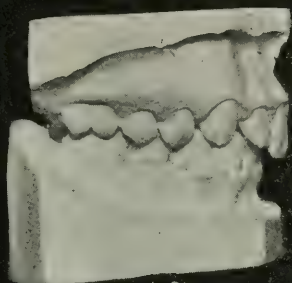


Fig. 31

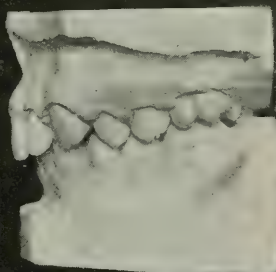


Fig. 31



Fig. 31

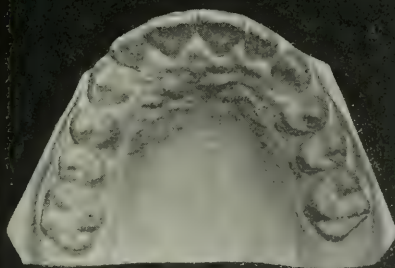


Fig. 32

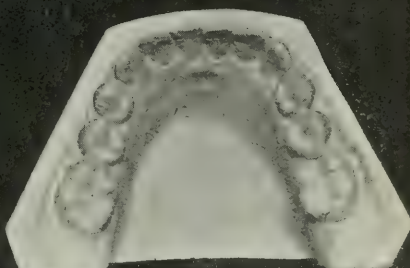


Fig. 32



Figs. 33 and 34.

U-shaped pieces, made from iridio-platinum round wire .022 of an inch in diameter, so as to engage each of the lower incisors on the labial surface just under the free margin of the gum. On the lingual side of each cuspid band is soldered a short, round tube, the bore of which is .036 of an inch. To the lingual screw on each molar band is soldered an iridio-platinum wire to pass forward, and so bent as to fit in the tube on the cuspid band on each side, and should enter this tube from the gingival aspect.

The expansion arch is now adjusted with Exp. A, so as to rest as nearly as possible in contact with the teeth, and securely ligated to them. In this way very little tipping of the molars can take place.

[We are indebted to "Items of Interest" for this excellent paper and the illustrations. Dr. Grieve expects it to be read in conjunction with his paper on page 417.—Editor.]

Dominion Dental Journal

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No. 10

DENTAL HOSPITALS IN GREAT BRITAIN

There are many very excellent features about the management of some of the dental hospitals of Great Britain. There is an air of surgical cleanliness about the conservation rooms, examination rooms and surgeries that is in marked contrast with what is often seen on this side of the Atlantic. The Royal Dental Hospital, London, for example, was built with an idea of its being kept clean. The walls are glazed tile with rounded corners; the floors are non-absorbent. There is an abundance of hot water. Every room where patients are seen or operated upon is supplied with an efficient sterilizer. One sterilizer is not expected to serve the whole building.

The reception, examination and advice to patients is a strong feature of all the British dental hospitals. This part of the work of the hospital is looked upon as perhaps its most important function. The consulting

dentist of the day meets the patients and advises them what they should have done. It is the duty of the clinical staff to carry out the advice. The most experienced dentists obtainable are on the consulting staff. The problems advised upon by such consultants are not so much whether a restoration should be one of amalgam or one of gold, but the relation mouth conditions bear to general health. It is the broader and more comprehensive view of dental practice that engages their attention. There are men in dentistry who are leagues ahead of the prosthesis, bridger, crowner, filler, inlayer, scraper, or polisher. There are those who recognize the possibility of preventing decay of the teeth by a regime of life and practice, and at the same time preventing indigestion and its effects. To the astute dental examiner the mouth reveals the past, the present and the future in matters of diet, health and hygiene.

Clinics such as are found in a few hospitals in England are well worth visiting. Canadian dentists could hardly concur in many of the practices resorted to to restore patients to health, but at the same time they would see that teeth, crowns and fillings serve a greater purpose than one of beauty or local comfort. Students in such hospitals, who are from day to day privileged to see such clinics, cannot but have a broad view of the practice of dentistry.

PAY YOUR FEES

Notices have been sent out by the Treasurer of the Royal College of Dental Surgeons to all licentiates in Ontario that their fees for 1913 are now due and should be paid before November 1st if they wish the right to vote. At the last election of members of the Board of Directors there was a contest in but one district. More interest would be manifested in the affairs of the profession if there were more contests. It is true we are well governed professionally, but there are other duties for a member of the board. This year the fee is two dollars, instead of one as formerly. It might well have been made three dollars, giving a discount of one dollar for prompt payment. At three dollars a year it would soon amount to a sum sufficient to make it worth while to sue for if not paid promptly.

It is all very well to say that members in arrears could not collect their accounts in court, but who ever heard of a dentist losing his case on such a pretext? The fact is neither the clients, lawyers nor the court know about it. If the treasurer of the board would give such information as would lead to failure of a suit in a few well chosen cases, it might be another way of stimulating prompt payment. The Board cannot be expected to manage the affairs of the profession without a regular income each year. The interest on the unpaid fees in the past twenty years and fees which will never be collected would equip a research laboratory, now much needed in the school of dentistry.

Dental Societies

NATIONAL DENTAL ASSOCIATION.

The annual meeting of the N.D.A. was held at Washington, D.C., Sept. 10, 11, 12, 13. The attendance was large and the programme compactly filled with matters of great interest to the dental profession. Besides a literary programme which kept all engaged or interested in it, exceedingly busy, there were 323 clinics without the volunteer efforts not on the programme.

The Union Oral Hygiene Meeting held on Friday evening under the auspices of the National Dental Association, The National Mouth Hygiene Association and the D. C. Dental Society, was largely attended and on the whole a great success. This meeting was open to the public as was also the meeting of Wednesday evening at which Dr. Wiley discussed the effects of impure food and adulterated drugs upon the human system, and Dr. Geo. E. Hunt the relation of teeth to health.

The notable feature of the whole convention was the relatively greater share of time and effort devoted to consideration of oral hygiene, mouth infection, the effects of oral sepsis upon the vital organs and other tissues of the body, prophylaxis, treatment, or rather prevention, of gingivitis in its incipency, and better professional and public education in regard to matters of this sort.

This tendency of the dental profession is most hopeful and encouraging. It means a broader conception of our duties and better use of our opportunities—a better ideal toward which dental education and practice should tend.

Oppressively warm weather made attendance at most of the sessions quite uncomfortable for one used to the climate of Ontario. The writer preferred to await the publication of most of the papers and discussion, rather than try to listen to them under such difficulty. This suggests thought of the time and energy expended by the officers responsible for the preparation and carrying out of the programme. They were on the job all the hours of these days and far into the nights, not to mention their labors previous to the opening of the convention. It is quite likely they felt tired. Their reward it appears, is the honor of holding office and the gratitude of those who enjoy the fruit of their labors.

W. C. GOWAN.

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CHICAGO DENTAL SOCIETY.

The officers of the Chicago Dental Society are planning a large celebration for Friday and Saturday, January 31st and February 1st, 1913. The programme includes two days of clinics by selected men from all parts of the country, one evening of papers by men of international reputation, concluding the two days meeting with a testimonial banquet to our esteemed confrere, Dr. Truman W. Brophy, of Chicago.

The dentists of Chicago will make every effort to see that the entire programme will eclipse all former meetings. Any dentist who has a new or interesting clinic to give at this meeting is cordially invited to correspond with the Chairman of the Clinic Committee, Dr. Fred W. Gethro. 917 Marshall Field Bldg., Chicago, Ill.

INSTITUTE OF DENTAL PEDAGOGICS.

The next annual meeting of the Institute of Dental Pedagogics will be held in Pittsburgh, Pa., January 28-29-30, 1913. An unusually interesting programme has been arranged and no progressive dental teacher can afford to miss this meeting.

FRED W. GETHRO, Secretary.

DENTISTS IN ATTENDANCE AT THE CANADIAN DENTAL ASSOCIATION AND ONTARIO DENTAL SOCIETY, BURLINGTON, 1912.

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The Royal Dental Hospital, London, Eng., has a rather peculiar regulation which prohibits any person holding the position of Dean of the Faculty for more than five years. This is rather a good thing when the members themselves have some say in the appointment.

Reviews

Mouth Hygiene and Oral Sepsis—By John Sayre Marshall, M.D., Sc.D., Syracuse University, Captain U.S. Army retired, formerly examining and supervising Dental Surgeon, U.S. Army; President of the Board of Examiners. J. B. Lippincott Company, Philadelphia and London, 1912. Price, \$1.50.

This book of two hundred pages is prepared for the student of medicine and dentistry, trained nurses, school teachers, sanitarians and the general public. It is plainly written, few technical terms, divided into three sections; Mouth Hygiene, Oral Sepsis, and Oral Hygiene propaganda. There are several illustrations. It is very useful to the dentist wishing to give public lectures on Oral Hygiene. On the whole its teachings are orthodox. The first part of the book is taken up with the "Present condition of the teeth of the public," then the description of the human mouth and its common diseases. Next eruption and care of children's teeth, and careful instructions to nurses and mothers. The section on tooth brushes and brushing the teeth is fairly good but not sufficiently explicit in some matters of detail, for example he says "brush the teeth up and down," this is good advice, but too frequently misunderstood. It is intended to mean to brush the upper teeth down and the lower teeth up. It is doubtful if floss silk should be recommended to very many patients.

The author makes a strong point of cleansing the tongue as well as the teeth. The chapter on "The Care of the Human Mouth during Illness," is very excellent and should be read by every dentist, nurse and physician. Below is a quotation from this chapter which illustrates the style and kind of instructions given:

"In the case of the mouth of the invalid who has been accustomed, previous to the present illness, to give proper attention to the cleanliness of the mouth and dental treatment, there are no difficulties that may not be overcome with tact and patience. In even the most desperate cases, where the temperature is running high and the mouth, tongue and lips are dry and parched, a gentle cleansing of the mouth is most soothing and grateful to the patient and eagerly sought thereafter; and, instead of being disturbing and harmful to the invalid, proves restful, as is often shown by being followed by refreshing sleep. It is not always possible to employ the tooth brush and water for cleansing the mouth, as the patient may be too weak to sit up or even to turn over on the side to eject the water from the mouth. Under these circumstances the mouth may be effectively cleansed by first wiping the teeth with a piece of sterile gauze, wrapped upon the first finger of the right hand or upon an orange wood stick—the finger being preferable for many reasons which are obvious—moistened in a two per cent. solution of carbolic acid or a

saturated solution of boric acid. Then with the orange wood stick, flattened at one end and wrapped with a few fibres of sterilized cotton, carefully rub the surfaces of all the teeth with a twenty-five per cent. solution of hydrogen peroxide, completing the cleaning of one tooth at a time. The foam which is caused by the effervescence of the hydrogen peroxide in contact with the fluids of the mouth may be wiped away with pieces of gauze moistened in orange water. This cleansing will usually prove so grateful and refreshing to the invalids that they will look forward to it with pleasurable anticipations."

The chapter on "Oral Hygiene in the School" should be read by every teacher and the chapter on "Oral Mouth Sepsis and the general health," while not at all comprehensive, points the direction of future progress in dentistry.

Lectures on General Anaesthetics in Dentistry, Advocating Painless Dental Operations by the Use of Nitrous Oxid, Nitrous Oxid and Oxygen, Chloroform, Ether, Ethyl Chloride and Somnoform—By William Harper DeFord, A.M., D.D.S., M.D., Dean and Professor of Oral Pathology and Anaesthetics, Drake University College of Dentistry; late Professor of Oral Pathology, Surgery and Hygiene, College of Dentistry, State University of Iowa; formerly Professor of Oral Pathology, Drake University College of Medicine; member of the National Dental Association; member and ex-president of the Iowa State Dental Society; member of the New York Society of Anaesthetists; honorary member of Missouri, Kansas, South Dakota and Colorado State Dental Societies, and the St. Louis Society of Dental Science; ex-president of the Iowa State Board of Examiners, etc., etc. Second edition with illustrations. Lee S. Smith & Son Company, publishers, Pittsburgh, Pa., 1912.

The object of this book is to give the busy dentist a working knowledge of such general anaesthetics as can be used to advantage in daily practice. With this end in view, the author has prepared what he has to say in the form of brief lectures. The "how" is dealt upon more than the "why"; in other words, it is simply a practical treatise, and not a theoretical exposition. The lecture style enables the author to talk directly to the individual just as is done in the class room and to repeat and emphasize from time to time the more important and essential things, which is not permissible in a text-book.

NOTE.—In the September issue of the DOMINION DENTAL JOURNAL credit was not given Dr. Cryer for cut No. 14, which was taken from Dr. Cryer's book to illustrate Dr. Thos. B. Hartzell's paper.

School Dental Clinics, their Foundation and Management—By C. Edward Wallis, M.B.C.S., L.R.C.P., L.D.S., Dental Surgeon and Lecturer on Dental Surgery, King's College Hospital, late Dental Surgeon to Victoria Hospital for Children, Chelsea, and L.C.C., Industrial School, Feltham. London: Claudius Ash, Sons & Co., Ltd., 5 to 12 Broad Street, Golden Square, W.

This book of sixty-five pages discusses the methods and appliances used in establishing and maintaining a school dental clinic. It describes the methods followed in several clinics in England. Gives outlines of suitable lectures for children and the public. Gives many cuts and diagrams of appliances and equipment for ordinary school clinics. It shows drinking fountains and tooth brush exercises. It should be a very interesting book for municipalities and school boards aiming to establish dental clinics.

Occasional Papers on the Prevention of Some Common Diseases in Childhood—By J. Sim Wallace, D.Sc., M.D., L.D.S., Dental Surgeon and Lecturer on Dental Surgery and Pathology, London Hospital; Hon. Dental Surgeon, West End Hospital for Nervous Diseases. London: Bailliere, Tindall & Cox, 8 Henrietta Street, Covent Garden, 1912.

This is a book of about one hundred pages, by Sim Wallage, who has written several books along this line. The opening chapter discusses "Diet in Infancy and Childhood." In it he calls attention to the transition from mothers milk to solid foods. He criticizes severely the softening of bread in milk and the feeding of porridge, points out that the craving for sugar in childhood may be accounted for by the lack of sugar which should be obtained from the mastication of starches. Soft mushy starches instantly swallowed gives no opportunity for the conversion of the starch into sugar, consequently such children crave sugar. In one chapter he directs special attention to the bad teaching of the general physician, where the feeding of children is concerned. One chapter deals with the "Prevention of Tuberculosis," and another with the "Prevention of Dental Caries." No other recent author has done so much to call attention to the prevention of dental caries and children's diseases by dietetic means. He points out that many children have been raised without decay of the teeth or indigestion by simply following natural methods of feeding.

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Original Communications

SOME POINTS IN THE RECENT PHYSIOLOGY OF THE MOUTH AND TEETH

BY D. FRASER HARRIS, M.B., C.M., M.D., B.Sc. (Lond.), D.Sc.,
F.R.S.E., Professor of Physiology and Histology in the Faculties of
Medicine and Dentistry, the Dalhousie University, Halifax, N.S.

Read before the Nova Scotia Dental Association, July 11th, 1912.

Mr. President, ladies and gentlemen, let us consider the foetal odontoblasts and adamantoblasts in which calcification begins so early. Since the absorb and fix lime in so notable a degree, there must be in them a peculiar high specific capacity for calcium, higher than in any other tissue, even than bone, which, of course, possesses the same thing to a less extent. Now, this power of fixing calcium must be due to chemical affinity in the microscopic dental germ, that is to say, chemical differentiation in the protoplasm must be established at a very early age. Whence is derived this high chemical affinity for calcium? This is part of a general problem, for we have to account for the following specificities of analagous nature, iron in the bone marrow, potassium in the muscles, iodine in the thyroid gland, sodium in the cartilages, and phosphorus in the brain.

In some way, then, the question of calcium fixation in the connective tissue and epithelium must be linked up with the wider one of calcium metabolism in general. But at this stage we must distinguish the normal anabolic fixation of calcium in living tissues—growing teeth, bone—from the deposition of calcium salts in tissues more or less devitalised. As examples of the latter we have the deposition of calcium carbonate in the rib cartilages after middle life, in the walls of inelastic arteries, in old caseous deposits, in malignant tumours, in fat necroses, as complete casts round the cerebral cells, in adipocere, and as tonsillar calculi. Thus, too, as belonging to the abnormal, is the frequently most persistent deposit of "tartar" underneath the alveolar festoons and between them and the fangs

of the teeth—a deposit serious because, even in the absence of all decay, it tends to loosen the teeth.

Let us state the metabolic problem. The arterial blood bathing all parts is of uniform composition; yet some tissues pick out phosphorus, others iron, others iodine, others calcium, and so on; by what mechanism?

The chemical factors for the absorption of any one element by any one tissue are: (1) Affinity-intensity by the tissue for the element; and (2) the amount or percentage of the element (its osmotic pressure) in the lymph. In terms of calcium, this is—the dental germ has a high affinity for calcium, and in the foetal blood there is a certain osmotic pressure of soluble calcium salts, but as far as we know there is no mechanism for augmenting the osmotic pressure of calcium in the blood supplying the foetal antecedents of the teeth. Now, in cases where we have abnormal, diminished absorption of calcium by tissues when there is plenty of calcium in the food, as in the case of rickets, the fault is that the calcium in the blood is not fixed by the bones, owing to their having a reduced chemical affinity for it. The chemical pathology of rickets is too little calcium in the bones and teeth, although there is *no* diminution of it in the food; the teeth are delayed in eruption, but decay and fall out earlier than normally.

The aberrant conditions in rickets seem to be a lowered chemical tissue-affinity for calcium, just as in scurvy there is a lowered affinity for potassium. Giving lime to rickety children does not improve the condition, like giving calcium to people with chilblains, or with the headache of meningeal oedema, or with urticaria. Of late years the whole subject of calcium metabolism has been re-studied, and it has been seen that closely bound up with the behaviour of calcium in the tissues is the presence or absence of the internal secretion of the thyroid gland. I would remind you of the present day view that the iodo-thyrin of the thyroid gland is absolutely necessary to maintain the chemical tone of connective tissue and of the central nervous system, and it would appear also to enable tissues to incorporate calcium. Indeed, borrowing terms from the bacteriologist, the current view might be put thus: the thyroid supplies the amboceptor, which is the link necessary to bind the calcium to the living substance. In rickets this is apparently absent, though what has caused the deficiency in the internal secretion of the thyroid is not clear. Rickets is now treated with thyroid extract, not with lime salts; the lime is there, but the intermediate body to attach the calcium (as by a side-chain) to the living nucleus (biogen) is not present. Children formerly called “strumous” with adenoids and soft teeth, who usually become tubercular, are really suffering from an inborn deficiency of thyroid secretion, i.e., congenital hypothyroidism. But without being actually strenuous, there are children “below par” from birth, just as in litters of animals (for instance of pigs) there are the chemically congenitally abnormal. Dr. Leonard Williams, of London, has given an interesting account of twins, one of which was normal, the other

abnormal, thus—it had subnormal temperature, was backward in teething, late in walking, and the mental development was delayed, the hair was less abundant and the body-weight was less than the other. Half a grain of thyroid extract twice a day for a few weeks brought this deficient child along side his brother in all respects—weight, hair, walking, mental condition, temperature and teeth. In many cases Leonard Williams found that Grey Powder coupled with thyroid extract converted an unsatisfactory child into a healthy one. There is, then, an intimate chemical correlation between the thyroid gland and connective tissue which ought to calcify, the hormone of the gland acting as an amboceptor towards the circulating calcium. Soft teeth may, then, indicate not that more lime is needed in food or as a drug, but that more thyroid gland activity is needed—and recognising this is the essence of organo-therapy.

It is just possible that a defective calcium metabolism may be casually referred back to intra-uterine life and to hypothyroidism in the mother. We believe that in normal pregnancy the gland enlarges to meet the increasing demands of the growing foetus as regards the intake of calcium. The maternal thyroid enlarges during pregnancy, not only to supervise the calcification of the foetal bones, but also to direct the anabolism of the mammary gland, which, as we know, is intimately concerned with the metabolism of large quantities of calcium phosphate. Thus it has been long known that the mother should have plenty of phosphate of calcium during pregnancy, but the connection between maternal lime and thyroid activity is only a late conclusion of the biochemists. It is clear that the meaning of good milk is that the moment the child is born there shall be plenty of lime for its continued needs in ossification and in dental calcification. Thus the chemical aspect of the health of the teeth is emphasised, and that aspect is not confined to the individual possessing the teeth, but stretches back to a pre-natal existence.

While these more subtle and more lately recognised factors are undoubtedly concerned in the calcium metabolism of the teeth—factors representing rather the congenital than the acquired aspect—we all know that micro-organic attacks are responsible for dental caries. I suppose I am right in asserting that there are bacteria which, by secreting acid products, soften and dissolve the lime of the teeth. This, of course, they will do the more perfectly if the amount of lime in these organs is originally deficient or if there is an excess of the carbonate as compared with, say, the intensely hard fluoride and silicate. Recently I notice that an English investigator has come to the conclusion that a great deal of the decay of stone and brick in buildings, which is of course a softening, is partly, at least, due to the presence of bacteria. It is not only lime-stone rocks which are thus softened, for the very hardest, the granites and the basalts, are as certainly disintegrated. The acid-producing organisms of the mouth I take to be distinct from those of dental caries and dental sepsis, and to begin

their work earlier, to prepare a place in fact for the microbes of putrefaction to enter into. An acid condition of the saliva undoubtedly aids these acid-secreting germs, and acid of the saliva arises from the fermentation of carbohydrate left between the teeth, so that the use of the toothbrush is on this account alone fully justified. Especially imperative is this in the case of the child; and the school toothbrush is an institution that has come to stay. My friend, Dr. Sim Wallace, of London, has recently laid a great deal of stress on the connection between caries and very soft food. He thinks that the children of the present day do not chew sufficiently hard food, which would remove from the teeth micro-organisms otherwise adherent. He says that we eat nowadays food far too pulpy, not resistant enough to rub off the clinging micro-organisms; too much sugary material is left in the mouth, says Wallace. I should like to hear what the dentists have to say about this notion.

We might now look at some of the relationships of the teeth to the *nervous system* which have been worked out recently. Some observations of the Russian physiologist Pawlow should be first of all mentioned. He made fistulae of the ducts of Steno and of Wharton, making the ducts to open through the wall of the cheek, and he then studied the effect of various stimuli in the mouth on the flow of parotid saliva and of submaxillary respectively. He used the dog. When the dog was *shown* flesh, submaxillary saliva flowed, but no parotid; when the dog *ate moist* flesh or bread, submaxillary saliva flowed, but hardly any parotid; when the dog *ate dry* flesh or bread, saliva flowed from both the glands. One infers that the centre for the flow of parotid saliva is not acted on by psychic impulses, whereas that for the submaxillary is; and that whereas either moist or dry flesh indifferently excites the submaxillary gland, only dry food excites the parotid. Further, while ice-cold water excited submaxillary saliva, it had no such stimulating effect on the parotid. We, therefore, seem justified in concluding that only dryness is the adequate stimulus for the secretion of parotid saliva, whereas all or any stimulation is sufficient for the submaxillary. But this must mean that the nerve-centres for these two glands are distinct, since there is this curious difference of response towards the same stimuli. Even if the centres were found to be anatomically one, we should have to postulate some functional differentiation in it; seeing that impulses of psychic origination affect some of its cells, but not others. Whereas *moist flesh* calls forth *no parotid* saliva, *dry bread* does; this is not a psychic effect, but a purely neural one, as the dog vastly prefers the flesh; it is a good example of differential stimulation as regards the secretory centre for the parotid gland. These results were quite unexpected.

The teeth have for a long time been recognised as the sources of what should be called *referred pain*, but what is sometimes incorrectly called reflex pain. It has long been called "sympathetic" pain. We all know

how that many headaches are due, not to any lesion within the skull, but to some abnormal condition, it may be anatomically and physiologically far away. The teeth, as sources of referred pain, give us the most typical cases of this interesting condition. Referred pain is due to the irritation in some afferent neurone from region A being able to irritate in the grey matter some neighbouring afferent neurone from B, always a skin area. A may be a viscus or, as in the present instance, a tooth; B is always the related area of skin said to be sympathetic to A. A diagram will, of course, make this clearer. Since the neurone from B is irritated, although not at its peripheral extremity, the mind refers out the irritation to a supposed illusory source at the periphery. Thus in many cases of carious teeth the referred headache is of temporal location. Suppose that the source of irritation is in the teeth of the lower jaw, we should here have the irritation referred from a fibre of the inferior maxillary division of the fifth nerve to one of the superior maxillary or second division. Dr. Purves Stewart relates the case of a lady of over fifty years of age who had, for eight years, suffered pain referred from a non-erupted wisdom tooth on the right. She had a burning sensation on the right side of her tongue and a numbness in the area of distribution of the second division of the trigeminus. The importance of investigating the teeth as the possible origin of referred headache is thus a very clear duty.

The teeth are once more typical examples of a most important neural activity, *i.e.*, reflex actions. We all know the convulsions due to teething; in physiological language these are excito-muscular reflex actions consisting in spasms of the voluntary muscles. It matters not that the source of the afferent currents is remote from the territories of muscular excitement; the actions are reflex all the same; the erupting teeth irritating the young jaws are as truly the causes of the convulsions in distant muscle as the teeth are the sources of pain referred to portions of the periphery at some distance from them.

The mouth furnishes us with one of the best possible examples of a reflex action, *viz.*, the flow of saliva as the result of mechanical irritation to the teeth and gums. No phenomenon is perhaps more familiar to the dentist; but have you ever reflected that there is no better example of a reflex action—genus sensori-motor, species sensori-glandular. You have the stimulus, the irritation of the metal instrument; you have the afferent limb of the reflex arc in the sensory neurone of the fifth nerve passing through the Gasserian ganglion. You have the centre for salivary secretion thus aroused; and you have the efferent limb of the reflex arc, the secreto-motor and vaso-dilator fibres of the chorda tympani nerve, if indeed the saliva flowing be produced by the lower pair of buccal glands. Further, the reflex action is physiologically typical. (1) It is not originated by consciousness; (2) it does not need consciousness for its performance, and (3) it cannot be inhibited by the will. In teaching the features of reflex actions

to junior students, I often take this flow of saliva as one of the best examples we have of that most important group of physiological activities.

One more topic connected with the innervation of the teeth occurs to me, and that is, the alleged effect on the teeth of states of mental depression. I may say at once that I am a most firm believer in the objective reality of the influence of states of consciousness on the bodily organs and functions. However difficult of explanation the phenomenon, no one can avoid believing that emotions act on the heart or can alter the rhythm of the muscles of breathing; that a fit of anger, for instance, can raise a man's blood pressure to a dangerous degree, especially if he be elderly and have some degree of arterio-sclerosis. We know well that mental depression lowers the blood pressure, takes lustre from the eye and elasticity from the tread, but the influences to which I allude are rather more subtle and rather less obviously localised as regards their sites of expression. In an interesting talk I had with a dentist in Scotland some years ago, I learned from him that he was firmly convinced that states of mental depression could influence the teeth and actually reduce their powers of resistance to the insults of micro-organisms. I was quite astonished at his asking me, after he had examined my teeth with that expertness tempered with gentleness for which your profession is noted, whether I had not at some time previously passed through a period of worry and anxiety. I replied that I had. He said: "I was sure of it; I see the effects of it on the teeth." Now, supposing that we take it as a fact that depressing mental conditions can really influence the vital state of such organs as the teeth, how might this be accounted for? Our chief anatomical difficulty is that, so far as we understand, there are no efferent nerves to the teeth. Wherever there are efferent nerves there is no theoretical difficulty in conceiving of impulses descending these and influencing in either a positive or a negative direction the nutritional condition of the tissue in question. But as impulses aroused by a conscious state cannot directly affect the dental tissue, may not the paths of the influence be somewhat more indirect? Might not the mysterious influence be somewhat on this wise? The state of mental depression might conceivably injuriously affect the metabolism of the thyroid gland; for glands, as we well know, are amongst the chief organs to be depressed in their activity by adverse mental states. The fact that it is a ductless gland, a gland with only an internal secretion, in no way affects the argument; it is richly supplied with nerves which in all probability are by no means all afferent. The output of iodo-thyrin being diminished, less amboceptor reaches the circulation and less lime is now fixed in the teeth, this less calcified region becoming an easier prey to the lime-dissolving and later the septic micro-organisms. This is pure conjecture, and I throw it out only as an unconsidered trifle in the way of physiological explanation of a very interesting state of dental nutrition.

There are other puzzles in connection with the nerves of the teeth. Dr.

Ritchie lately gave me one which I have much pleasure in handing on to you—why do certain persons with apparently healthy teeth invariably have toothache from eating chocolate?

We all know the organs of the teeth as the organs of the proper mastication of food, and how that imperfectly chewed food becomes imperfectly digested food, and therefore the source of toxins which on absorption are detrimental to the bodily health. But Professor Pawlow has taught us that the mechanical operation of chewing has a neuro-chemical value over and above that just mentioned. The movements of chewing and swallowing food causes reflexly not only a flow of saliva but also a flow of gastric juice. This latter fact was not previously known; but its full significance is not merely that juice is prepared for food before food arrives in the stomach; there is a chemical significance in the presence of the acid of the juice. As soon as the hydrochloric acid of the juice reaches the duodenum, it converts a substance—prosecretin—in the wall of that part of the tube into the active secretin, a material which is at once absorbed into the blood. This secretin, a hormone as it is called, or chemical excitor of activity, stimulates the pancreas to pour out its fluid and also stirs up the liver to increased activity. The activity of the teeth has been very largely responsible for this chain of chemical events. Of course hydrochloric acid, besides activating prosecretin, performs a number of other functions, viz., keeping gastric digestion antiseptic, activating pepsinogen, opening the pyloric orifice to allow the acidic chyme its entrance into the duodenum. For all these things, the teeth are more or less directly responsible. Such are the things causally related to healthy teeth, but a chain of untoward events may result from teeth which are already carious. The constant absorption of the products of the activity of pus-forming organisms in the teeth is responsible for many of the toxæmias. I could hardly have believed, had I not experienced it myself, how sleepy, depressed and unfit for work a person can become solely on account of pus in a tooth. I had a painful tooth, and was daily becoming more tired and generally unfit; when I went to the dentist and asked him to draw it. This he did, and found an abscess in and around the fang; to my great satisfaction all the sleepiness and malaise had disappeared in a day or two. Here we had a clear case of pus of dental origin poisoning the whole system and incapacitating one from due exertion: so widespread may be the results of a strictly local, morbid, dental process. Dental sepsis, like other forms of sepsis, may, by the poisoning I have spoken of, predispose more or less distant tissues to become infected; thus dental sepsis may actually predispose to an arthritis of microbic origin which clears up on one's giving an autogenous vaccine derived from the pus obtained from the teeth.

But a decayed tooth may, I believe, become the source of some persistent chronic morbid condition not at all obviously related to it. I remember having had for many months catarrhal congestion of the left nasal mucous membrane, which produced obstruction of the airway. Almost immediately on having a left molar drawn, I felt something clear up on the left side of the nose, and in a day or two all signs of catarrh had vanished. I believe in this case that the carious tooth had reflexly induced a state of chronic vaso-dilatation, resulting in a predisposition to purulent infection. Vaso-dilatation brings this about, since it provides the necessary liquid as nidus for the invading micro-organism; and further a state of chronic vaso-dilatation is associated with reduced power of resistance of the tissues in question. We can therefore appreciate the modern tendency to suspect the teeth of being the source of even very distantly situated mischief. I think there is little doubt that dental pus-formation may be one of the factors responsible for so widespread a bodily condition as neurasthenia.

I might remind you that the first bacterium ever seen was removed from the surface of the teeth. This was in 1683 by that indefatigable worker with the microscope—one of the earliest of that distinguished band—Anthony van Leeuwenhoek, the Dutchman. He was born at Delft in 1632, and died there in 1723.

The last topic which occurs to me that might be of interest to you is that of the physiological anatomy of the nerves of taste. The subject emphasises the difficulty of fitting our recent conceptions of the functions of neurones into the rigid forms of anatomical nomenclature derived from a fairly remote period in the history of the study of the nervous system. The only practicable way of describing the taste-fibres from the gustatory papillae of the posterior one third of the tongue is to say, that certain afferent neurones from this region are found in the nerve-trunk known to anatomists as the glosso-pharyngeal. These have their trophic cells in the petrosal ganglion, and thence ascend as the nerve of Jacobson, which joins the small superficial petrosal nerve leading to the otic or Arnold's ganglion. Through this ganglion, related to the third division of the trifacial, the fibres pass, and thus enter the Gasserian ganglion, with whose cells, however, they make no functional connection. Centrally of this the gustatory fibres must end in some specialised cells of some sensory nucleus in the medulla or pons, presumably cells of the sensory nucleus of the fifth nerve, but they might quite possibly be of the ninth. Now we have here a case that would puzzle the anatomical systematists; for them every nerve fibre must be the branch of some nameable nerve. But these gustatory fibres were found first of all in the ninth, later in the special nerve of Jacobson usually called a branch of the ninth, then in the small superficial petrosal which connects the geniculate ganglion of the seventh with the inferior maxillary branch of the fifth, then in the Gasserian ganglion of the fifth,

and finally were found to terminate either in the sensory nucleus of the V. or in that of the ninth. Of what are these fibres branches? Of the ninth, of the seventh, of the fifth? A great problem! They begin in the ninth, travel in the seventh, and end in the fifth; the anatomist may well be puzzled to assign these gustatory fibres a place in his rigid scheme. The fact is, that his scheme, based on naked-eye, dissectional procedures, breaks down when applied to the latter day exigencies of comprehending the increased details of the purely functional study of nerve-fibres.

The chorda tympani nerve presents the systematist with similar difficulties. The gustatory fibres in the anterior two-thirds of the tongue travel peripherally in the lingual branch of the inferior maxillary of the fifth nerve; they then ascend in the trunk of the seventh as high as the geniculate ganglion itself, in which are found the trophic cells, and in which the fibres turn round through an acute angle to enter the great superficial petrosal nerve. This leads to the sphenopalatine or Meckel's ganglion through which the fibres gain access to the second division of the trifacial nerve. They then traverse the Gasserian ganglion, and so reach the central nervous axis in some sensory centre of which they terminate in the usual synaptic manner. Which centre we know not; it may be of the fifth or it may be of the ninth, but whichever it is, it is *not* the nucleus of the facial nerve, although most anatomists would tell you that the Chorda Tympani was a branch of the seventh nerve. Of what nerve is it then a branch, the V. or the VII.? As an afferent fibre it cannot be the branch of such a nerve as the facial, which has only motor or efferent fibres. It is more likely to be a branch of the V., but, if so, it is not confined to the V. in its upward course. The best way out of the difficulty is to say that these gustatory fibres are the fibres of a nerve *sui generis*. These things show us we cannot put the new wine of physiological discrimination into the old bottles of anatomical terminology.

DISCUSSION ON DR. D. FRASER HARRIS' PAPER.

DR. FRANK W. RYAN (Halifax): Mr. President, Ladies and Gentlemen: I am sure that I express the sentiment of every member of this Association when I say that we are deeply grateful to Dr. Fraser Harris for this most excellent paper. We have for years been trying to induce the medical profession to assist us more energetically in making our fellow citizens realize the value and importance of a sound masticating mechanism, and the dire effects upon health and general efficiency of any serious interference with the function of mastication. Therefore, I say that we highly appreciate the fact that a man of Dr. Fraser Harris' acknowledged prominence in that profession realizes the importance of this subject and should take the trouble to prepare and read to us this most estimable paper. Much of it is pretty technical where he endeavored to bring to us the up-to-the-minute views of the medical profession upon subjects of particular interest to us as dentists.

I suppose it is largely my duty on opening this discussion to emphasize such points as appeal to me, to pick holes if I can see anything to pick at, to put up figures that Dr. Fraser Harris in closing may have something to knock down, to the end that we may more thoroughly understand the paper and be benefitted thereby.

Now the doctor has said a good many things in this paper and raised a good many points. He starts out with the problems of calcification or calcium metabolism; and tells us it is bound up with the larger problem of the specialization or differentiation of tissue in general. This involves practically the problem of evolution from simpler to more complex forms of organisms.

An organism consisting of a single cell possesses within that cell all the functions necessary to its life. When a cell is specialized to perform a certain function, as in higher forms of life, it surrenders or loses the ability to perform certain other functions, and is dependent upon some cell or group of cells that has been specialized to perform that lost function. Hence arises that interdependence of the various organs of a highly complex organism.

Through the fluids of the body the exchange of products is made. The doctor tells us that there are two factors involved in the absorption of any element, as for instance the fixation of calcium salts. First: The cell affinity. Second: The osmotic pressure or percentage of the element in the fluid; and also, speaking of calcium secreting cells, that there is no known mechanism of increasing the osmotic pressure. But we can increase the cell affinity, or rather supply the missing link, by which the cell can appropriate the lime salts, and this is found to be the iodo-thyrin of the thyroid gland. I would like to ask the doctor if he regards the extract of the thyroid a specific. Is it only the thyroid gland that is at fault, or may it not be, in some cases at least, some other elements that are lacking or over-produced.

I noticed in the last "Cosmos" a paragraph copied from the Dental Record, mentioning the results of Dr. Cassmann's recent investigations as to the composition of Rachitic bones. I quote it: "He found that normal bones contained 1 per cent. more water than Rachitic bones, this difference being fairly proportioned to that of calcium. The quantities of phosphoric and carbonic acid are also diminished, but the proportions of the acids to the calcium are the same as in normal bones, so that there would appear to be the same stable combination of calcium with these acids in rachitic as in normal bones. Magnesium is present in greater proportions in rachitic than in normal bones. In connection with this fact, it is interesting to note that the human teeth at the present time contain more magnesium than those of the prehistoric period, and they are at the same time less resistant. Further, teeth predisposed to caries are richer in magnesium. It would appear, therefore, that this augmentation in magne-

sium is an important factor. The proportions of chlorine, sodium, potassium and nitrogen do not show any modification." (So much for the quotation.) We believe that rickets is more apt to occur in children suffering from malnutrition, born under unfavorable circumstances, brought up in confined or damp situations, badly nourished, with insufficient exercise, bad air and lack of sunlight. The treatment has been directed largely to the improvement of the hygienic conditions, and thus improving the nutrition. Pure air, exercise, nourishing diet, etc.

The exhibition of the thyroid extract in the treatment of the case of the twins reported by Dr. Leonard Williams was certainly very satisfactory and almost convincing, as the hygienic conditions for each of those boys must have been very similar.

We are told that we must distinguish between "the normal anabolic fixation of calcium in tissues; growing teeth and bone; from the deposition of calcium salts in tissues more or less devitalized, as in the rib cartilages after middle life; the walls of inelastic arteries and the 'tartar' underneath the alveolar festoons, etc." We are not told why, or how we are to distinguish. Does the doctor mean that we should not administer thyroid extract late in life, or that there is too much thyroid extract in later life, so that cells not normally differentiated are stimulated to secrete calcium? Does it favour the formation of tartar?

We are all familiar with the appearance of defective calcification of teeth due to sudden interference of nutrition by severe illness; and may not the less obvious defects be due to similar causes? We are aware also that in the developing teeth and jaw the deposition of lime salts, and the absorption of lime salts, are being carried on at the same time. What is it that changes a lime producing cell into a lime absorbing cell? I should not be very much surprised to find it at least accompanied by some change in nutrition.

The essayist announces quite clearly the germ theory of caries of the teeth as we understand it, so far as he goes, but distinguishes the acid producing bacteria from those of dental caries and dental sepsis. I presume by the latter that he means the germs that destroy the organic substance of the dentine. We classify the acid producing bacteria as primarily, and, in case of enamel, solely responsible for caries, and at least equally culpable with the others in the decay of the dentine.

The statement "that an acid condition of the saliva undoubtedly aids these acid secreting germs" may possibly be questioned. We are taught that an alkaline saliva favours the formation of the mucoid or gelatinoid substance that serves to hold the bacteria in contact with tooth tissue and prevents the product of their action—a nascent acid—from being diluted or washed away. Free acid in the saliva does not decay the tooth, but it does tend to dissolve or prevent the formation of gelatinoid plaques, and

consequently may not favour the acid-secreting germs which cause the decay.

We no doubt all endorse the opinion of Dr. Sim. Wallace as to the adverse influence of soft and pulpy foods and the stimulating and cleansing effects of hard and fibrous foods; also we commend the timely remarks concerning the tooth brush.

The results of the experiments of the Russian physiologist, Pawlow, on the stimulation of the salivary glands by different foods is very interesting and instructive, particularly that it is dry food that stimulates the parotid gland. I think it is Dalton that states that it is the parotid that furnishes sulpho-cyanate to saliva. Coupling with this the interesting chain of effects upon the digestive fluids induced by the mechanical motion of the jaws in chewing, and the prophylactic effects of hard and fibrous foods already referred to, we make up a pretty strong case for the use of food prepared in such a way as shall produce thorough mastication.

Of cases of referred pain and reflex action our literature affords many instances; most of us, I take it, have seen examples of it in our practice. The doctor's very graphic elucidation of the mechanism involved elicits our warmest admiration. Doubtless we all concur with the doctor in believing in "the objective reality of the influence of states of consciousness on the bodily organs and functions." Though I am not so sure that we can so readily agree with him as to how the mental conditions of depression, worry, etc., effect tooth tissue. There are at least two methods by which a citadel or fortress may be lost. One is by weakening of its defences, and another by the strengthening of the attacking forces. The essayist, it seems, assumes that the citadel of the tooth falls because of a weakening of its defences, and while recognizing an "anatomical difficulty in the absence, so far as we know, of efferent nerves to the teeth," ingeniously suggests that indirectly by inhibition of the thyroid gland less calcium may be fixed into the tooth, and our defences thus weakened. But this hypothesis does not take into account the still greater difficulty that the enamel, once formed, cannot be increased or diminished by any internal influences whatever; it not only has no nerves or avenues of communication with the rest of the body, but the very organ or cells that form it are destroyed in the process of its formation; and enamel that has once been destroyed can never be restored, so far as we know, by any natural process, normal or abnormal. On the other hand, the doctor tells us "that glands being richly supplied with nerves are amongst the chief organs to be depressed in their activity by adverse mental states." He has told us that salivary glands respond readily to different stimuli, and we know, or think we do, that the salivary secretions are modified or chemically changed according to the stimulus activating them; thus these glands in normal state pour out the secretion necessary to produce insalivation of the various foods presented to them, facilitating the further digestive process.

Can we not, then, easily surmise that under abnormal or vicious conditions, either physical or mental, these secretions might be so altered as to strengthen the attacking forces of micro-organisms either positively, by furnishing them with the pabulum they require, or negatively, by restricting the inhibiting substance which the normal saliva may contain.

I will mention one other point, though I am sorry that I am taking up so much of your time.

It is the expression "hard and soft teeth." These terms, I take it, are expressive of two distinct conditions. In the one it indicates a difference in the comparative immunity and susceptibility to decay, and in the other case it indicates a difference we appreciate when using our instruments upon tooth tissue. As to the first application, we are now taught that the more or less perfect calcification of the teeth, while it may be, and no doubt is, a predisposing factor in caries, is in no sense a cause of the disease. We have probably all seen cases where very imperfectly calcified teeth, pitted teeth, atrophied teeth, fractured teeth, have remained for many years doing good service in mouths comparatively immune; and, on the other hand, we have seen teeth of much more perfect form and structure, when erupted, melt away in a few months when under adverse conditions, or, as we say, in susceptible cases. The fact, which we deem to be fairly well established, that the cause of caries is external to the tooth and independent of any internal conditions, affords us gratification. We may well despair of materially affecting the structure of the teeth, especially after they have once been formed. But we may look forward with confidence that we may yet discover how to prevent the ravages of this most prevalent disease. In the second application of the terms "hard and soft," the comparatively slight difference of calcium in the different analysis of the teeth would hardly be appreciated under the instrument. The difference, which I think is confined to the enamel, depends upon the relation of the enamel rods. When the rods are straight the enamel splits or cleaves easily, and we call that soft tissue. When the rods are twisted or gnarled it is very difficult to cleave, and we call that hard tissue. It would seem that to apply the term "hard and soft" in either case is at least inappropriate.

I feel like questioning the essayist's explanation of the pathological conditions he mentions as occurring in his own mouth, but I thank you, Mr. President, ladies and gentlemen, for your attention, and make way for others.

DR. S. G. RITCHIE (Halifax): Mr. President, Ladies and Gentlemen: My friend, Dr. Ryan, in opening this discussion, has expressed to you his keen appreciation and admiration for the superb paper you have just heard read, and in the most fitting terms has presented to the distinguished essayist of the evening the thanks which the members of this Association owe him for laying before us to-night in his inimitable way

some of the latest results of physiological research, which are of special interest and value to the dental profession. With all Dr. Ryan has said I am in perfect accord, and I feel highly gratified that the opportunity has been offered to me to make a few remarks on this paper, which I believe to be one of the most notable contributions to the literature of dental science in recent years.

Huxley, in one of his essays, expresses wonder at the capacity Darwin had for compressing into a few paragraphs an immense number of facts from his prodigious store of knowledge. As I listened to the essayist of the evening I was struck by the facility with which he was able to accomplish the same result, for truly we have here an encyclopedia of facts pertaining to things dental.

It has been my privilege during the past four years to lecture to the students of the Maritime Dental College on the histology and embryology of the teeth, and I have had ample opportunity to find out how woefully deficient is our knowledge, not only of the structures themselves, but more especially of the processes from which they are derived. Calcification is one of these. That two tiny sections of tissue, totally distinct in their origin, pinched off in intimate relation the one to the other, to form the tooth germ, should be able to bring about a like result, viz., calcium metabolism, is, to say the least, perplexing. But Dr. Harris, in his first topic, has furnished the key which to some extent solves the problem. The iodothyron from a neighboring gland is the presiding genius whose good offices are necessary before calcium deposition can take place. For explanation of the phenomenon Dr. Harris falls back upon the ingenious theory which has been so productive of great results in bacteriology and pathology. But it is well to remember that this explanation can only be provisional. Ehrlich's theory of cell assimilation, based on chemical combination, is purely intellectual in its nature. The cell itself, according to his theory, is nothing but a tremendously complex central group of atoms sufficiently stable to enable the cell to retain its identity, to which are linked up innumerable subsidiary unsatisfied atom complexes (side-chains), which, through their combining affinities, bring the central group into relationship with the material necessary for metabolism. The theory is indeed ingenious, but let us not forget that the nature of protoplasm is still a mystery beyond the skill of bio-chemistry to unravel. I have always believed that vital activity is something more than a chemical formula, and after studying Bergson's wonderful books I am the more convinced.

Exception has already been taken to the statement that an acid condition of the saliva aids the acid producing germs. As a matter of fact, clinical experience shows very clearly that the reverse is the case. It is hardly necessary for me to say anything further on this point, since Dr. Ryan has covered the ground, but before passing on I would like to cite against the essayist's contention the workers in the lemon groves of Sicily.

Leon Williams tells us that these people are inveterate lemon eaters, yet their teeth are remarkably free from caries.

That greater functional activity of the teeth in mastication is necessary can hardly be gainsaid. Sim Wallace is undoubtedly correct with regard to soft and pulpy foodstuffs as a normal diet. No better illustration in support of his contention could be offered than that of the Esquimaux. According to Peary and others, they eat incredible quantities of raw fish, seal and other meat, and in addition prepare and soften skins largely by means of the teeth. As a result, Hrdlika tells us, the average size of their teeth is perceptibly larger than in other related ethnic groups; the jaws have become larger and more massive, the muscles of mastication more powerful, and caries is practically unknown.

Pawlow's experiments on the flow of saliva are extremely interesting. No one is in a better position to confirm them in the human than those of our profession. The stimulus of operating about the mouth is sufficient to produce a tremendous flow from the submaxillary and sublingual glands, but chiefly from the former. In some cases, when the mandible has been dropped suddenly to its full extent, I have seen jets from Wharton's ducts thrown completely out of the mouth. My observations with regard to parotid saliva agree with those of Pawlow. In the attempt to get a dry field of operations, the parotid is certainly stimulated to greater activity. I am almost tempted to believe that the contents of this gland form a reserve supply for use in emergency, when the submaxillaries are taxed beyond their powers, as in the case of dry foodstuffs.

Just a few words with regard to one other point in Dr. Harris' address and I will have finished. The human tooth is an extremely difficult object to study histologically or otherwise. Owing to its hardness, the relations of its various parts are by no means easy to determine. By the use of newer methods, however, advances have been made. Some four or five years ago Sweitzer was able to demonstrate the lymphatics of the pulp, and thus the intricate network of tubuli, canaliculi and interglobular spaces become much more intelligible when considered as a lymph drainage system. More recently still, Mummery has demonstrated before the Royal Society the penetration of the tubuli by nerve fibrils. Might it not be possible that it is to these hitherto unknown fibrils that the pain caused by eating sweets, in the case mentioned by Prof. Harris, is due?

There is much more in the doctor's address of which I would like to speak, but it would hardly be fair for me to monopolize any more of the time left at our disposal. I sincerely hope that this, his first appearance before us, will not be his last.

I.

Professor Fraser Harris, in replying to his critics, said he wished, first of all, to thank Dr. Ryan and Dr. Ritchie very warmly for their most kindly expressed satisfaction at the address he had just delivered.

Dr. Ryan had asked in what way a cell secreting calcium differed from a cell absorbing calcium. Dr. Harris said he did not quite comprehend the term "secreting calcium" in this connection. The calcium to be absorbed was in the form of salts in the blood; and cells, or rather inter-cellular material, would absorb it so long as the protoplasmic substance had the due chemical affinity for the lime, and the lime was maintained at the sufficient osmotic pressure in the blood and lymph bathing the protoplasm in question. The Professor said that he had in his address indicated the newly recognised metabolic link between the protoplasm and the lime in the hormone of the thyroid gland. He agreed with Dr. Ryan that possibly other factors were at work in calcification—probably the internal secretion of the pituitary gland, because this gland had a good deal to do with proper bone development in that, if it were diseased in early life, the person grew up a giant, if in later life, the person suffered from acromegaly, an overgrowth of the bones of the face and hands.

As regards decalcification, Dr. Harris did not mean to say that acidity of the saliva was itself the agency in softening teeth, and admitted that he may have been wrong in supposing that acid saliva encouraged rather than inhibited acid-producing buccal micro-organisms. But there were apparently two distinct methods whereby teeth might be softened, if not decalcified, a chemical, of which our knowledge was imperfect, and a vital by phagocytosis. The phagocytes it was that loosened the primary teeth and absorbed the dentine of their fangs.

Professor Fraser Harris, in conclusion, spoke of the innervation of the teeth. He said he had no doubt that Mr. Mummery's demonstration was of nerve-terminations into the dentinal tubules, although the paper in the proceedings of the Royal Society is only an abstract. But even if Mummery has succeeded in making a clear histological demonstration of the dentinal nerves, that will not prove whether they are afferent or efferent. From the existence of dental pain we know there are afferent nerves; we have as yet, however, no proof that there are any efferent nerves. Of course, there is the assumption that can be made that impulses at times may *descend* the afferent fibres, i.e., travel anti-dromically, but this is an assumption which, as it breaks the Bell-Magendie law, must not be made without very full experimental proof. At the present time there is only one well authenticated exception to that law.

The Professor thanked his audience very cordially for the kind way in which they had received him and listened to so technical a paper.

CAVITY PREPARATION FOR GOLD INLAYS

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Read before the Toronto Dental Society Nov. 19, 1912.

In the preparation of proximo-occlusal cavities for foil or amalgam many good operators hesitated to practice "extension for prevention;" not that they denied the pathological reasons for it, but because they objected to the cruelty, the mutilation of the tooth and the greater expenditure of labor and time. Such operators preferred to take the chances involved in moderate preparation, rather than cut away sound parts of the tooth for fear they would decay.

Since cast inlays came into use preparation of cavities for them has been even more wasteful than was the extension preparation for foil. To secure bucco-lingual extension at the gingival, still wider cutting at the marginal ridge is practised to allow removal of the wax. The interior form and dimensions found necessary for making a wax pattern are about the same as for the insertion of foil. So, on the whole, waste of tissue is no less in the pattern method for inlays than it had been for foil, but rather more.

Desirable as it has always been to lessen or avoid painful cutting, weakening of walls, and closeness of metal to pulp cornua, improvement in these directions was limited by the qualities and requirements of the filling materials or by the requirements of the method used for making inlays. The cavity was of necessity prepared to suit a form of inlay that could be made; and until means were found to make inlays of better form cavity preparation could not be radically changed.

In Price's Artificial Stone and new technique we have the means to make the inlay suit the cavity—not the cavity to suit the inlay. And now we may modify or omit, without loss of any essential quality, those wasteful and sometimes cruel procedures in cavity preparation hitherto necessary. The cavity may be formed in accordance with requirements, dynamic or pathological, without allowance for pattern making. The newly developed possibilities of form and texture of the inlay allow modifications of cavity that could not formerly be used with success.

Those who use artificial stone are under no compulsion to adhere to more than the outline form of the orthodox foil cavity and to that only so far as pathological or aesthetic considerations govern outline. The interior of a complex cavity may be of a form entirely unsuited to foil filling and yet consistent with all the principles upon which the success of a gold inlay depends.

Foil or amalgam fillings, like bricks and mortar, stand best in rectangular masses set upon flat foundations. For want of tensile strength or by reason of the manner of their construction, fillings of these materials

do not hang well. Cast inlays will stand well upon flat foundations too; but they may sometimes hang quite as well as they would stand, and therefore do not always require flat foundations to support their gingival ends. Nor do they, when placed in teeth, require the form of rectangular blocks to resist tipping stress. The qualities of cast gold adapts it to other and preferable designs for the prevention of movement under any kind of stress to which a complex inlay is exposed.

A cast inlay of complex form differs from the corresponding foil filling, in tensile strength, means of retention, manner of insertion, and form necessary for resisting strength, considering the relative strength of the cavity walls to the strength of the casting.

Gold alloyed with 5 per cent. of platinum or coin silver or re-enforced with platino-iridium wire and cast under high pressure is stronger in all ways than is a foil filling of like size and form, and therefore need not be so massive.

Certain interior dimensions and form of cavity are necessary for the insertion of foil that are not necessary for the insertion of an inlay.

To withstand occlusal stress a proximo-occlusal foil filling requires a broad flat gingival wall, at right angles with the tooth's axis, as a foundation, and a dovetailed step on the occlusal as a brace. An inlay on the other hand, being a single tough, rigid piece, is supported by the whole transverse area covered by it. Its hooklike hold in the occlusal portion of the cavity is much stronger against movement than that of a foil filling, so that to resist occlusal stress a relatively smaller gingival wall and sometimes none at all is needed.

Where the dentine underlying a marginal ridge is not destroyed by decay, broad rectangular preparation of the proximal portion of the cavity only transfers a part of the stress resisting area from the step to the gingival wall without at all increasing this area. Such preparation for a gold inlay, while perhaps necessary for making a wax pattern in the mouth, is not necessary for retention, or resistance against occlusal stress. It is, moreover, a cruelty when practiced in vital teeth and a waste of tissue in any tooth. Thin edges of a gold inlay can be extended any desired distance beyond the necessarily deep parts of a cavity. Therefore extension of cavity outlines to immune areas does not require, as for foil, a like extension of deep parts designed for retention resistance or convenience.

By use of impression and stone model complex cavity preparation for gold inlays can be more simple and less wasteful than for any other filling. Resistance and retention are secured with less cutting of dentine and bucco-lingual extension without cutting dentine at all.

A thickness of gold sufficient to withstand the impact of opposing teeth without changing form and a depth and distribution of parts effectual for resistance and retention when cemented are necessary always. But

no advantage is gained by addition to the mass of gold in excess of these requirements. The remainder of the cavity space, if any, were better filled with cement.

With our present facilities cast inlays do not *exactly* fit cavities. They fit approximately. The joints are closed by burnishing. Speaking from experience, the greater the mass of gold in a cast inlay the greater will be the errors in fit due to small though unavoidable inaccuracies such as arise from nodules, or expansion or contraction in wax, investment or gold. And the massive casting is more stubborn to deal with and more likely to fracture the tooth in case of small error in fit than is a thinner one.

ORDINARY PROXIMO-OCCLUSAL PREPARATION.

After excavating debris to ascertain the extent of decay, fill the cavity with temporary cement, such as calxine. With safety-disc and water cut the proximal surface flat, cement and enamel together until a satisfactory cavity outline is established by the margins of the facet so prepared. It is not necessary that this facet be exactly flat, but it will be found that flat preparation of either proximal surface of a molar or bicuspid will terminate in an outline fairly resembling ideal extension for prevention. Where proximal decay in a vital molar or bicuspid is not extensive, preparation of the facet will not involve cutting of dentine.

The planes of this facet may incline slightly to the long axis of the tooth occlusally to allow withdrawal of impression or to terminate the facet gingivally without a step. In bell crowned teeth with small decay the plane of the facet need not so incline. In large decay it will incline more than in small.

Prepare the occlusal step with square-edge wheel so as to terminate in a pit or groove to be deepened for the reception of a hook on the inlay. Bevel the margins upon the collusal with stone points.

With a tapered fissure bur-cut a groove parallel to the long axis in the cement as deep axially as retention may require and reaching from the step to the dentine at the gingival termination of decay. This groove may vary in form, or depth axially, according to space or retention or resistance needs of the case, but it always marks with certainty the gingival termination of the cavity, beyond which only the bevelled enamel extends.

If the impression of the gingival outline should be mutilated in withdrawal, the end of this groove marks the place so well that no error need be made in building wax or finishing gold. The rib upon the casting produced by this groove serves as a buttress to strengthen the casting, guide it to place in setting, afford the cement a firm grip, and the inlay additional security against movement under stress.

For m.o.d. cavities preparation is very simple, the mesial and distal portions being united by a square groove with bevelled margins. The bur-cut grooves are always used in the m.o.d. parts for reasons above stated.

Chisels are not used in thus preparing cavities.

Before setting the inlay remove the temporary cement and all decayed tissue.

Advantages of the new preparation are:—

1. Conservation of tooth tissue and economy of time and labor. Conservation of the strength of cavity walls and avoidance of painful cutting and needless removal of tissue in the region of the marginal ridge. Adequate bucco-lingual extension gingivally without wasteful cutting at the marginal ridge.

2. An abrasive with excess of water cuts sensitive tissue with less pain than steel instruments cause. Enamel cut with wet abrasive is in better condition to resist attack of any kind than if cut with steel instruments.

3. The impression and stone model technique for which this preparation is intended lessens the work done in the mouth, to the comfort of patient and operator.

4. The figure of the casting for this preparation, especially of an m.o.d. cavity, makes the control of shrinkage in solidification of gold upon the stone model effectual, so that inside dimensions of the casting are maintained, resulting in more accurate fit.

5. The relatively thin inlay, with consequently larger quantity of cement or tissue between gold and pulp, better protects against thermal irritation. The greater overlap of joint protects the cement in case of inaccuracy of fit, for by their thinness the margins of the casting yield to the burnisher, allowing perfect closure of joints. An inlay that does not touch the interior surface of the cavity at all points is more easily made to fit all the margins than is a massive casting intended to fit the whole interior of such a cavity as foil would require.

6. The gold being outside the tooth issue rather than inside it, *i.e.*, the tough material enclosing the brittle, the latter is better protected against stress and abrasion. This permits the conservation of walls too thin or weak to remain in any other form of cavity, or for any other design of inlay or filling of metal.

7. The principles, if not the detail, of the preparation described are applicable to any complex cavity where a gold inlay is indicated, whether molar, bicuspid or incisor.

THE DENTIST AS A SOCIAL WORKER

A. W. THORNTON, D.D.S., L.D.S., TORONTO, ONT.

Read before Canadian Public Health Association, Toronto, Sept., 1912.

Words are so curiously co-related that the use of one word, or the expression of one action, consciously or unconsciously, suggests another word, or action.

So when we speak of a dentist we have a mental picture, not only of a man or woman who has pursued a certain course of training and renders a particular kind of service to the community, but we have, too, a definite idea in our minds of the kind of service such an individual renders.

In the consideration of the subject it is the work or service that is of paramount importance, not the individual who performs the work or renders the service, though the two are inseparable.

It would be a criminal waste of time to discuss "Socialism," in any form whatever, though the temptation to do so is very great. But one or two axioms of political economy may not be amiss, and may serve as a foundation or starting point for the paper. It will, I think, be admitted by all that, "as mere bodily sustenance is the first condition of life for the individual, so the primary aim of life is the establishment of a tolerable human existence." In other words, if man is to live, life should be made as enjoyable as possible.

But "no man liveth to himself." Social life to-day in civilized countries is exceedingly complex, and if harmony is to prevail, and if "the greatest good to the greatest number" is to come anywhere near to being an accomplished fact, each must contribute to the welfare of all, or as the formula of the canon of production and distribution runs, "from everyone according to his abilities to everyone according to his needs."

That life to-day is more strenuous than ever before in the world's history is a fact, heard from every platform and read on every printed page.

Out of this strenuous life have grown many "sayings" or aphorisms, one of the most recent and most characteristic of the age being, "Maximum efficiency." With this thought in mind, every effort is put forth to show the greatest possible "output" with the least possible expenditure of time, energy and capital.

The machine which will not stand the strain must be relegated to the scrap-heap. The human machine is no exception to the rule. "Always at my best" must be the motto of the one who hopes to "keep in the race" under existing conditions.

The human machine and the mechanical contrivance have this in common; the energy which enables them to accomplish their work must be supplied them from some outside independent source. No perpetual motion contrivance, mechanical or human, has yet made its appearance, possessing

inherent energy to carry on its own peculiar activities.

Just as our factories must have power from coal, water-power or other source of supply, so our bodies must have energy, and this is furnished by the daily food supply.

This material for physical energy must be properly prepared for its passage through the alimentary canal, and the alimentary canal itself must be kept in the best possible condition to furnish nourishment which the whole body requires, each section of the canal performing its own special function in a normal, healthy manner.

The mouth and teeth, being the entrance to this canal, are without doubt its most important parts.

I need not dwell on the importance of the part played by the mouth and teeth in the process of digestion.

What I do wish to lay stress upon is the condition of the teeth and oral cavity and the effect of these conditions on the health and happiness and possibilities of service of the individual.

I will describe but three conditions of the oral cavity.

(1) Where the teeth are all in place, without cavities, and the gums and mucous surfaces healthy.

(2) Where the teeth are without cavities, but the gums and mucous surfaces are filthy and diseased.

(3) Where the teeth have cavities and the gums and mucous surfaces are filthy and diseased.

The first condition (where the teeth are all in place, without cavities, and the gums and mucous surfaces healthy) is of course very rare.

The reasons, of course, are not hard to find. No better culture bed for bacteria could possibly be found than the human mouth; the temperature is always right; moisture is always present. Convenient incubation and abundant food supply are always to be found in the uneven surfaces and interstitial spaces of the teeth.

What wonder then if teeth decay and mouth conditions are almost universal.

The fact is then that we find the second and third conditions to be almost universally present, that is, the teeth may be free from decay, but the gums and mouth dirty and diseased, or the teeth may be decayed and the diseased condition of the mouth may also exist.

Bear this thought in mind, it is rare indeed to find healthy gums and mucous surfaces where there are many badly decayed teeth. The reason for this is so apparent that I will not need to enlarge upon it.

The question, however, that we are concerned with here are,

(1) What are the results of the conditions that we know to exist? and

(2) What can be done to remedy these conditions?

The first condition we note as a result of decayed teeth is human

suffering, and God knows there is enough suffering that can not be prevented, without having a single pang that might have been prevented.

I know of nothing more pitiable in connection with my practice, than to have a mother come in with a little child suffering from a decayed tooth: pitiable not only because of the extreme suffering at the time, but pitiable because it is so nearly impossible to do anything for the majority of small children at the acute period of the ailment.

In the next place, where the teeth are decayed it is manifestly impossible that the body should be properly nourished. The food cannot be properly masticated, the salivary glands fail to perform their share of digestion, the stomach and the remaining portion of the intestinal track are overburdened, the system's balance is disarranged, and physical, mental, and I believe moral suffering are bound to ensue.

I wish it were possible to make all parents understand, how absolutely necessary it is that the first teeth should be kept in good condition. The general feeling is that the condition of these so-called temporary or first teeth is a matter of very great importance as they will soon be lost anyway.

But if you will just stop to think for a moment, you will realize that the growing boy or girl must assimilate food sufficient not only to accomplish the physical work of the day, the endless running and jumping and skipping, but provision must be made, too, for the growth of the body going on so rapidly during the years of physical development. How necessary then, that all the organs of mastication, digestion and assimilation should be kept at their best.

But there is a phase of this question that has been almost entirely overlooked in the past, a side of it that is of stupendous importance to the social life of the nation. Mention has already been made of the ideal conditions found in the mouth for the production of those germs which produce certain diseases.

In the average mouth, where there are decayed teeth many varieties of these disease-producing germs may be found, among others the germs of pneumonia, diphtheria and tuberculosis.

The result is that these diseases manifest themselves just as soon as there is a lowering of the vitality; or they are communicated to others, and thus an epidemic is started, and parents wonder how their children "caught it." In my own practice I have seen several most lamentable cases of tubercular glands, the tubercle bacillus find a path to the glands through carious teeth, and alveolar abscesses.

I heard Dr. Evans, when commissioner of public health in Chicago, say that for a long time they battled without success against diphtheria and scarlet fever. Patients would be discharged from the isolation hospital, apparently cured, and the disease would make its appearance in other members of the family, after the return of a child from the hospital. To the astonishment of the physicians, it was found, that the germs of the

disease were present in the mouth, teeth and tonsils. When the discovery was made, the remedy was not hard to find. The teeth and mouth were made clean, carious teeth were filled and the conditions materially bettered.

Speaking of mouth conditions, Dr. Osler, in an address before the Royal College of Surgeons, in London, says: "If I were asked to say, whether more physical deterioration was produced by alcohol or by defective teeth, I should unhesitatingly say, defective teeth."

The mouth conditions of Britains, if not a national disgrace, are certainly a national calamity.

During the Boer war seventy per cent. of the men who presented themselves for enlistment at one of the recruiting stations were rejected because of mouth conditions.

The able editor of the Toronto Globe discussing the social condition of the British people drew special attention to their "shrunken faces, and toothless, bloodless gums."

I have wondered sometimes, whether the toothlessness was the cause or the effect of the social conditions.

Booker T. Washington says that a tooth brush is a mighty agency in the social uplift of his people.

Pride in ones personal appearance is certainly a mighty asset in social regeneration, and certainly one of the most beautiful features of the human face is a good set of teeth, well kept.

The campaign for mouth hygiene is almost world wide. Some experiments of the most interesting character have been carried on in connection with this campaign.

In Cleveland forty boys and girls, nearly all children of foreign born parents, and from the most congested parts of the city, were formed into a class. The dentists of the city volunteered to put the mouths of these children into the proper conditions. The children were taught what to eat and how to eat it.

Psychological tests of these children were made by the university professors at the beginning of the experiment. The treatment and the tests were kept up for ten months. The gain in mental efficiency was almost 100 per cent. To be absolutely accurate, the gain in efficiency was a little over 98 per cent. But the mental gain was far from being all that was accomplished. The physical and moral improvement were just as marked. The whole character of these forty children seems to have undergone a marvellous change for the better.

The mouth conditions of these forty children were similar to the mouth conditions of the vast majority of the children of all our public schools. What was done for these children might be done and should be done for all the children of the nation.

There is another side of the question which I would like to draw attention. Last week at the Exhibition, I noticed the splendid exhibit of the

health department of Ontario Government. I saw all the dolls representing the babies of the Province. I saw the mechanical contrivance with the grim reaper "death"—and all the little graves, illustrating the awful fact that one child out of every four born in Ontario died in infancy, and that many of these deaths should have been prevented.

Just across the aisle from that exhibit, less than ten feet away, was an array of nursing bottles, and nurses showing how these might be kept clean and sweet. And there were directions how the milk (cow's milk) should be treated so that the babies might have a chance for life. But why so many bottles? Cow's milk is for calves, not for babies. But when I thought of all the mothers, whose teeth and mouth conditions are such that "horrible" is the only word that describes them—when I thought of the number of times I have said to a mother, "Are you nursing your baby?" and the reply came, "I had to wean it; it was not doing well, and I am so poorly myself" I am not surprised that so many nursing bottles are used, and that so many babies die.

Think of a woman, with teeth badly broken down, with gums inflamed, with pus exuding from old roots, with fistulas opening pouring pus into every mouthful of food on its way to the stomach. Is it any wonder that such mothers are not strong enough to nurse their children, or that babies are poisoned by the milk of such mothers?

But I have said enough of the conditions. What can be done to remedy the existing conditions? The dentists of this country know the conditions, as no other class in the community knows them. Does the knowledge entail the responsibility? I believe it does. Do not, however, misunderstand me. I do not mean that the dentists of Ontario could or should remedy the existing conditions, by giving their services to a suffering public. This, of course, is manifestly impossible. But it is true to-day, as it was three thousand years ago, "The people are destroyed for lack of knowledge." The best that a dentist can hope to do, is to point out the conditions and their awful consequences. It would take almost all the dentists of Ontario properly to care for the teeth of the children of Toronto alone.

There is a campaign for hygienic mouths for the children of Chicago being carried on at the present time, and those who are interested and know the conditions say that it would take all the dentists of Michigan, Indiana and Illinois to care for the mouths of the children of Chicago.

But the dentists must assume the responsibility of educating the people along the lines of mouth hygiene. Something is now being done in some of our public schools. This work should be multiplied a hundred fold. Every teacher in training, from kindergarten teachers to university professors, should receive from competent dentists instruction along these lines, so that children, young and old, might be taught to guard against the evils that follow in the wake of diseased mouth and teeth. Something is now

being done by Y. M. C. A.'s along the line of shop work, where in the large factories health talks are being given to the workers. It perhaps, will not be thought strange that these working men are more deeply interested in the talks on the teeth and mouth, than in any other form of health talks. The reason is not hard to find. They know from experience the suffering and loss due to diseased mouth conditions.

Our Y. M. C. A.'s offer equally good opportunities for a campaign of education. But how is the work to be done? The dentists of this country are very busy men, and most of them are far from being wealthy. Only the most self-sacrificing will give time and energy to a campaign of this kind, for love's sweet sake, and thus far "the luxury of doing good" has been their only reward.

Let us draw your attention to the facts that to me are most astounding.

If you will read the reports of the medical and dental inspection of the public schools, you will see that the diseases of the mouth and teeth far outnumber all other diseases combined.

And yet the medical schools of this country send out their students without any teaching concerning this most prevalent of all diseases.

Another peculiar fact.

The splendid work of the health department of the Ontario Government is worthy of all commendation.

Recently the Province has been divided into a number of districts, and medical man assigned to each. Not a single dentist assigned, although dentists alone have a working knowledge of the disease most prevalent in every community in the Province. It seems strange, does it not?

A few years ago "hog-cholera" was epidemic in some counties in Ontario. Veterinary surgeons were kept by the Government in these counties, to stamp out the disease, and prevent it spreading.

The whole nation suffers from diseased mouth conditions. The Government so far has taken no notice. "There is some advantage in being a hog."

Does the Government know that a certain form of tumor, once very prevalent among the people of the southern States, is disappearing since the people began to take proper care of their teeth?

Does the Government know that a large percentage of cancers occur in the mouth, tongue, throat, stomach and other portions of the intestinal tract? Is there no connection between this fact and the inflammatory conditions that always accompany diseased teeth?

Yes, the dentist must do the work of education, but not as a philanthropist. The nation's well being is at stake, and the Government of the nation should undertake this educational campaign, for the benefit of the general public.

In almost every civilized country in the world there is at the present time a vigorous campaign being carried on for hygienic mouth conditions.

If we look only on the surface this is a hopeful sign. But the campaign has been started almost entirely by dentists who saw the conditions, and realized the consequences of these conditions.

In their enthusiasm they started a campaign of instruction. In a few places the dentists volunteered to give their services without remuneration to treat those who needed the services of a dentist. But the work overwhelmed them and it was abandoned in almost every centre in which it was attempted.

In a few places (notably in Boston) millionaires have established and endowed dental clinics, where the teeth of the poor for all time may be looked after free of charge.

But what is to be the result of this campaign of education? Certainly a knowledge of the conditions, and the evils consequent upon the conditions is not the end sought after. The conditions should be improved and the consequent evils averted.

But how can this be done? Two things stand in the way of this devoutly to be wished for consummation. One is that there are not enough dentists to do the work that is now presented, and the other is that if there were dentists enough, the unskilled wage earner to-day can not pay for medical or dental attention.

Every dental college on the continent is being besieged for graduates. Cities, towns and villages are writing us for young dentists and offering good openings. The colleges cannot and are not supplying the demand.

But the second obstacle—the unskilled laborer to-day cannot pay for dental service. How can he? I have given some thought to sociological questions, and I believe I know whereof I speak.

Let me state the position. Take as an average wage earner, the man who makes twenty-two cents an hour, married and has three children. He works ten hours a day and six days a week. Thirteen dollars and twenty cents a week. He cannot get a house to live in for less than sixteen dollars a month, so that four dollars a week must go for rent. What they eat will cost them at least five dollars a week. So that there is left four dollars and twenty cents to pay for coal, gas, water, clothing, carfare, perhaps a little insurance in some fraternal organization, and the thousand and one et ceteras that occur in every home. Tell me how under the heavens are such men to obtain either dental or medical attention for themselves or their families.

The case I have stated is above rather than below the average.

A laboring man said to me a short time ago, speaking of present social conditions: "I have attended four funerals in the last three weeks of men who died from the shop in which I work. There is no doubt in my mind that these men died because of the conditions under which they had to work, and under which they had to live at home. The most that a laboring man can make in our shop is fifteen and a half cents an hour." \$9.30 a week. Think of telling such people that they should have their teeth fixed.

God bless the millionaires who, like the three Forsyth brothers, of Boston, give some of their millions to establish and endow free dental clinics. May the good Lord greatly multiply the number of such.

And yet I can see a vision of a vastly better condition.

If millionaire employers would give to the wage-earner a fair share of the wealth which the wage-earner does so much to produce, then such laborers might secure dental service, not as a charity or a gratuity, but as a service, paid for as men desire and delight to pay for that which they receive. The pauperizing process which always accompanies the giving of charity would be materially lessened. There would be some earnest of that more abundant life which the Man of Galilee said He came to give, and of that brotherhood He came to establish.

There is, however, this comforting thought of the campaign for hygienic mouth conditions, and the dental inspection of school children.

The children in the public schools are learning that clean teeth are not likely to decay, and that clean mouths make for strong bodies. This itself is a great boon. And I believe that some solution of the problem will be found. When the people are fully seized of the importance of good teeth and clean mouths, when school boards realize the financial loss occasioned because children whose mouth conditions are bad require extra time in the public schools, when Governments learn that the national wealth is lessened because "maximum efficiency" is impossible from men whose mouth conditions are not what they should be, when Britain learns that the condition of her people's teeth is more to be feared than the German peril, then and not till then will the lamentable mouth conditions, now so nearly universal, give place to a better order of things, and "tolerable human existence" will more nearly be realized.

ROOT EXCISION

W. C. GOWAN, D.D.S., L.D.S., Peterboro, Ont.

For excision of a root apex in surgical treatment of chronic alveolar abscess the best instrument known to me is a tapered dental fissure bur of small size. This good kind of bur is made for preparations of inlay cavities. Its transverse cut is a left hand screw-thread, and its end is made to cut a flat bottom in the hole made by it. The figure of this bur is that conic section called a "frustrum." The bur described will cut off the apical portion of a root more quickly and smoothly than any other instrument I have tried. Apply the bur across the root and draw and push it a short distance while revolving, as you would use a short saw. Try one on an extracted tooth to see what movements and guard of the hand are needed to cut as desired.

If after trying this particular bur you find any other instrument better for the operation, kindly report to this journal and oblige.

Dental Societies

ORIGINAL CONSTITUTION AND BY-LAWS
OF THE
CANADIAN DENTAL ASSOCIATION,
ORGANIZED IN MONTREAL,
SEPTEMBER, 16th, 17th and 18th, 1912.

PREAMBLE.

Whereas, it is desirable to maintain and cultivate the professional and social relations existing among members of the Dental Profession, practising in the Dominion of Canada, we hereby form ourselves into an Association, for the purpose of promoting the art and science of Dentistry, with all its collateral branches, and have adopted for our government the following Constitution and By-Laws.

CONSTITUTION.

ARTICLE I.—*Name.*

This Association shall be called "THE CANADIAN DENTAL ASSOCIATION."

ARTICLE II.—*Officers.*

(a) The officers of this Association shall be a President, Vice-President, Secretary, Treasurer and Registrar, these with three other members to be chosen by ballot at the regular biennial meeting of this Association, shall be the Executive Committee, and shall hold office for the two years next ensuing their election, or until their successors are appointed. A majority of votes given at such regular meeting being necessary to a choice.

(b) In addition to the Officers of the Executive Committee, each Provincial Dental Association shall appoint one of its members to the Office of Provincial Secretary of the Canadian Dental Association. He shall hold office for two years from the date of his appointment, or until a successor is appointed.

ARTICLE III.—*Membership.*

1. The Association shall consist of active, corresponding and honorary members.

2. Any regularly licensed practitioner of dentistry in active practice in the Dominion of Canada, who is in good standing with the Provincial Association or College, of which he is a member, may become an active member of this Association upon payment of the membership fee, and upon signing the constitution and by-laws.

3. Corresponding members shall be non-residents of the Dominion of Canada, must have the same qualifications for membership as active members, shall be exempt from membership fees, but shall not be eligible to office.

4. Honorary members: those licentiates who have honorably retired

from practice, and those members who have shown their interest in the Association by having paid their dues for twenty years, and those members who have served their profession for a term of years on the Provincial Boards of Examiners, may be elected honorary members, and shall be so designated on the membership roll. They shall be exempt from the payment of membership fees, and shall not be eligible for election to office in the Association.

ARTICLE IV.—*Meetings.*

The Association shall meet biennially, and the meetings shall be devoted to the presentation of addresses and papers on Dentistry and Collateral Subjects, discussions thereon, and suitable clinics, with such social features as may be deemed advisable.

BY-LAWS.

I.—*President.*

The President shall preside at all meetings, call special meetings, approve bills, and perform such other duties as usually devolve upon the presiding officer.

II.—*Vice-President.*

The Vice-President shall perform the duties of the President in his absence.

III.—*Secretary.*

The Secretary shall keep a record of all the proceedings of meetings, shall enter all accounts approved by the Executive Committee in the minute book. He shall keep a copy of all official correspondence received or sent by him, and shall make a report to the regular biennial meeting of the Association.

IV.—*Treasurer.*

The Treasurer shall collect all dues, keep a correct account of all receipts and expenditures. He shall not pay out money except on approval of the President. He shall prepare a statement of his accounts at the expiration of his term of office, and shall deliver to his successor all monies, books and other property of the Association in his possession after audit. The accounts of the Association shall be audited at each regular meeting by two active members nominated by the President.

V.—*Registrar.*

The Registrar shall keep a list of all members on which he shall note date of election and place of residence, time of death, resignation or loss of membership.

VI.—*Membership.*

(a) Every candidate for membership must be a licentiate in good standing, and must sign the constitution within three months after his application..

(b) No active member can vote whose membership fees are in arrears.

VII.—*Editor.*

(a) It shall be the duty of the Executive Committee to appoint an Editor who shall prepare for publication all proceedings that shall be deemed of sufficient importance by the Executive Committee.

(b) All papers read before this Association shall become its property, and be delivered into the hands of the Editor, in order that they may be published in any journal selected by this Association for that purpose. The papers and transactions of this Association shall appear in no other publication until after said journal has presented them upon its pages.

(c) Nothing herein shall be construed to prevent the reading of a paper elsewhere after having been read before this Association.

VIII.—*Executive Committee.*

The Executive Committee shall provide proper places for meetings of this Association and prepare the programme for such meetings, and shall transact such other business of the Association as may come before them.

IX.—*Provincial Secretaries.*

The Provincial Secretaries shall have a seat at the board of the Executive Committee, and shall assist in the preparation of the programmes for the regular meetings of the Association and such other business as may be referred to them by the Executive Committee.

X.—*Discipline.*

The Executive Committee shall constitute a court for the trial of members for the violation of the Laws or Ethics of the Association. Charges against a member shall be made in writing, addressed to the President. He on receiving them shall call a meeting of the Executive Committee to investigate. If the Executive Committee, after investigation, shall be of opinion that the charges are well founded they shall report to the Association, at its next regular meeting, when the Association shall determine the penalty, be it reprimand, suspension, or expulsion, which may be decided by a two-third majority of the members present. If during the investigation of the Executive Committee, the accused party or his representative shall fail to appear before the Committee, he shall be considered as admitting the truth of the charges against him, and shall be liable to sentence accordingly.

XI.—*Fees.*

(a) On signing the constitution and by-laws, active members shall pay into the treasury two dollars, which shall be the fee for the ensuing two years.

(b) The fee for active membership shall be two dollars, payable at or before each regular biennial meeting.

If the dues of any member remain unpaid for two years, his name shall be erased from the list of active members of this Association, provided the Treasurer has notified him by registered letter at least two months previous to the biennial meeting.

(c) Corresponding and honorary members shall be exempt from the payment of membership fees.

XII.—*Meetings.*

(a) This Society shall meet every alternate year unless otherwise ordered by the Executive Committee. The time and place of next meeting shall, when possible, be announced at each regular meeting.

(b) The President may call special meetings of this Association at his discretion, and upon the receipt of a written request from fifty active members, shall call such meeting, due notice of which shall be given by the Secretary.

(c) The regular meetings of this Association shall be held during the months of August or September, and at such place as the Executive Committee may decide.

(d) All Officers of this Association shall be elected for a term of two years, at the regular meeting, or at any meeting specially called for the purpose. The Officers elected shall be installed at the close of the meeting.

XII.—*Quorum.*

(a) A quorum of the Association shall consist of thirty active members.

(b) A quorum of the Executive Committee shall be four members.

XIV.—*Debates.*

No member shall speak longer than ten minutes, or more than once upon the same question, unless by special consent of the Association.

XV.—*Alterations and Amendments.*

Any alteration or amendment to the constitution or by-laws must be made by notice in writing, and signed by the member making the same. It must be presented at a regular meeting, and can be voted upon at the next regular meeting, when a three-fourths ballot vote for its adoption shall be necessary.

XVI.—*Order of Business.*

1. Call to order.
2. Minutes of previous meeting.
3. Officers' reports.
4. President's address.
5. Election of officers.
6. Unfinished business.
7. New business and programme.
8. Announcement of time and place of next meeting.
9. Adjournment.

XVII.—*Ethics.*

The code of ethics as generally adopted by the profession, is substantially recognized by this Association, and any charge of violation of it shall be investigated by the Executive Committee.

SUGGESTED AMENDMENTS MADE AT THE MEETING IN MONTREAL, 1906.

The Executive Committee will then have power of appointing five members in the city in which the meeting is to be held, and I would move that the Executive Committee be empowered to appoint five members to constitute a local committee, also to appoint a Second Vice-President who shall be the chairman of the local committee. This local committee will have power to appoint its own secretary. Their powers will be to organize and handle the whole meeting.

These are the suggestions we have put before you. Somebody please second them. The above motions were then seconded by Dr. Hanna and carried.

NOTE.—These suggestions were embodied in the new constitution which follows.

NEW CONSTITUTION MADE AT THE OTTAWA MEETING, 1908.

REPORT OF THE COMMITTEE ON CONSTITUTION.

DR. WEBSTER: At the last meeting of the Association it was thought wise to improve our organization a little in the way of a constitution, and the late Dr. McInnis asked Dr. Willmott, Dr. Spaulding and myself to draft a constitution suitable for this Association. We met and drafted the following constitution, which the Executive Committee adopted this morning.

PREAMBLE.

Whereas, it is desirable to maintain and cultivate the professional and social relations existing among members of the dental profession, practising in the Dominion of Canada, we hereby form ourselves into an Association for the purpose of promoting the art and science of Dentistry, with all its collateral branches, and have adopted for our government the following Constitution:

Article 1.—Name.—This Association shall be called the Canadian Dental Association.

Article II.—Officers.—The officers of the Association shall be a President, first Vice-President and Secretary-treasurer, who shall be elected by ballot, at the last regular session of the biennial meeting, on nomination of the Nominating Committee, appointed by the President and second Vice-President, who shall be a resident of the place where the next meeting of the Association shall be held, and who shall be appointed by the local committee of Arrangements, of which he shall be chairman.

Article III.—Executive Committee.—The Executive Committee shall consist of the officers of the Association and one representative from each

Province not represented by an officer, to be elected in the same manner as the officers.

The Executive shall fix the time and place for the next meeting and shall at once appoint a local Committee of Arrangements, which shall consist of five members, who thereby become members of the Executive Committee.

The Local Committee shall appoint the sub-committees on Essays, Clinics, Transportation, Entertainment and Exhibits. Upon these shall devolve the duty of making all the arrangements for the biennial meeting.

Article IV.—Membership.—Any dentist in Legal and Ethical practice in the Dominion of Canada may become a member of the Association for the meeting and become entitled to all the privileges thereof by payment of the sum of two dollars.

Honorary members' names may be carried in the books, unless otherwise ordered by the Association.

ORDER OF BUSINESS.

1. Calling to order.
2. Reading of Minutes.
3. Reports of officers and committees.
4. New business.
5. Naming Nominating Committee.
6. Programme.
7. Announcements.
8. Adjournment.

CODE OF ETHICS.

Article 1.

Sec. 1. The dentist should be ever ready to respond to the reasonable wants of his patrons, and should fully recognize the obligations involved in his duties towards them, as, in many cases, they are unable to comprehend the operation or service performed, or to correctly estimate its value. The practitioner must be guided by his own sense of right in treating the cases, as his own superior knowledge dictates. His manner should be gentle and sympathetic, and yet sufficiently firm to enable him to secure the best results of his skill. He should gain the confidence of his patrons, not alone by the skilful performance of difficult operations, but also by attending carefully to the simple cases committed to his care.

Sec. 2. The dentist without being obtrusive or pedantic, should impart such information to his patrons as his opportunities afford him, in regard to the causes and nature of the diseases in the teeth or adjacent parts, which he may be called upon to treat; and should explain to them the importance of availing themselves of such timely preventatives or remedies as he may deem necessary to their welfare. He should also communicate

such general information as shall enable them to exercise an intelligent appreciation of what the profession aims to accomplish.

Sec. 3. The dentist shall be temperate in all things, keeping both mind and body in the best possible health, that his patients may have the benefit of that clearness of judgment and skill which they have a right to expect.

Article 2.

Sec. 1. Every member of the dental profession is bound as such to maintain the honor and integrity of the profession. To this end he should himself be upright and courteous in his intercourse with the public, and his brethren in the profession.

Sec. 2. It is unprofessional to resort to public advertisements, such as cards, handbills, posters or signs, calling attention to peculiar styles of work, photos, lithographs, or engravings made from wood, steel or other materials; advertising free operations, prices of services, special modes of operating, or to claim superiority over neighboring practitioners; to publish reports of cases, or certificates, in the public prints; to go from house to house soliciting or performing operations; to circulate or recommend nostrums, or to perform other similar acts. But nothing in this section shall be so construed as to imply that it is unprofessional for dentists to announce in the public prints, or by card, simply their names, occupation, and place of business, or in the same manner to announce their removal, absence from or return to business, or to issue to their patients appointment cards.

Sec. 3. The dentist, when applied to for merely advice or temporary relief, by the patient of a reputable practitioner, whose services at that time he is unable to procure, should guard against disparaging the family dentist by hints, inquiries or any other means calculated to weaken the patient's confidence in him. At the same time the dentist should not, from too high a sense of professional courtesy to his neighboring practitioner, allow the interests of persons so applying for counsel or service to be jeopardized.

Sec. 4. When general rules shall have been adopted by members of the profession, practicing in the same localities, in relation to fees, it is unprofessional and dishonorable to depart from these rules, except when variation of circumstances require it. And it is ever to be regarded as unprofessional to warrant operations or work as an inducement to patronage. It is also unprofessional to violate or be a party to the violation, in letter or in spirit, of the dental law.

J. B. WILLMOTT,
W. G. L. SPAULDING,
A. E. WEBSTER.

A MEMBER: What about people coming in from a foreign country?

DR. WEBSTER: They will be either guests or honorary members.

A MEMBER: With or without fees?

DR. WEBSTER: Without fees.

A MEMBER: Will you state the preamble again; it does not state anything about the ethical side of the Canadian Dental Association.

DR. WEBSTER: Then we have the code.

A MEMBER: Is it mentioned in the preamble?

DR. WEBSTER: No, I do not think it is. It just reads that "we have adopted for our government the following Constitution." It is in the membership paragraph, the item you refer to—"any dentist in legal and ethical practice."

A MEMBER: May I ask Dr. Webster what he said about the order of business?

DR. WEBSTER: The usual order is just tabulated at the bottom.

A MEMBER: Then we have one.

DR. WEBSTER: Oh, yes, we have one, but I have not read it.

A MEMBER: By what standard may a man be judged as to whether ethical or not?

DR. WEBSTER: By the standard of the Executive Committee. The code is here.

A MEMBER: And if he signs the code, you decide it?

DR. WEBSTER: We do not have to decide. We just report it. In Ontario if a man comes we just accept his fees, but he is not a member until the Executive Committee decides whether he is a member or not.

DR. BARBOUR: Do I understand there is no continual membership, and only those registered at the meeting are members?

DR. WEBSTER: Yes.

A MEMBER: It is desirable to have a representative of each Province.

DR. WEBSTER: Yes.

A MEMBER: And if a Province is not represented in the membership it will not be represented on the Executive?

DR. WEBSTER: I do not think so.

A MEMBER: I know one or two Provinces very weakly represented here, and perhaps at the next meeting they will have no representative.

DR. WEBSTER: There is nothing mentioned about that; the Executive will handle that. Whatever is not mentioned the Executive will decide upon. I think it is provided that they can look into matters of that kind and deal with them.

DR. WOODBURY, Halifax: I would like to ask Dr. Webster what the object is in not having a continuous membership—what the advantages are in simply having a membership of the meeting.

DR. WEBSTER: It is to avoid encumbering your books with names of those not present. There are many fees that you could not collect even if you tried, from those not present.

A MEMBER: You can collect as well as the United States collect the National fee. They collect hundreds of dollars from absentees.

DR. WEBSTER: I will ask Dr. Willmott to discuss that. It was his suggestion to the Committee.

DR. WILLMOTT: At the last meeting I was appointed one of the Committee to devise a Constitution, and we looked over a very elaborate Constitution, but a large proportion of it was unnecessary. We form an association extending from the Atlantic to the Pacific, and the places of meeting will be anywhere from 500 to 1,000 miles apart, so the attendance, from the nature of things, must be largely local, and we thought we would secure the greatest good to the greatest number by making the Association largely the character of a convention, with no more Constitution than necessary to make provision for the following meeting, and the Constitution just read by Dr. Webster was formed with that idea in view. Of course in this country we do not have the other dentists except the class of legal and ethically in practice. If one goat should happen to stray in, I do not think we would be very much worried about it. Supposing we associated with a man who was not ethically in practice for three or four days, it would not cut any figure, and we take it for granted that all our members are ethically in practice and all eager to advance the interest of the organization. As to permanent membership, we tried that years ago in Ontario, and we found that some men after a few years in arrears never turned up again, and then we adopted the course to make membership simply for the meeting, and when those gentlemen put in an appearance they paid their share to the meeting, and I think for our purposes and for the object we have in view that is very much preferable to attempting to keep up a permanent membership, with the enormous distances that separate our members from each other.

THE PRESIDENT: The matter was pretty thoroughly threshed out at the Executive Committee meeting this morning, and I will put the question now. Those in favor of the adoption of the report as read will say yes.

The report was declared carried unanimously.

Amendments made at the Hamilton meeting of the Canadian Dental Association, 1912.

The Local Committee in charge of any convention shall have power to increase the registration fee to the extent of two dollars: provided it is needed to meet necessary additional expenses.

MINUTES OF THE MEETING OF THE D.D.C. HELD
AT THE BRANT HOTEL, BURLINGTON, ONT.
JUNE 7, 1912

Credentials were presented from Dr. Frank Woodbury, Nova Scotia; Dr. J. M. Magee, New Brunswick; Dr. H. R. Abbott, Ontario; Dr. G. F. Bush, Manitoba; Dr. W. D. Cowan, Saskatchewan; Dr. E. M. Doyle, Alberta.

A letter was read from Dr. Bagnall, Prince Edward Island, indicating sickness as a cause of absence of the representative of that Province.

Dr. Nolin, of Quebec, presented himself, asking to be heard from that Province.

Moved by Dr. Cowan, seconded by Dr. Woodbury, that Dr. Nolin be admitted to this meeting and allowed to explain the position of Quebec. Carried.

Dr. Nolin addressed the Council and stated that in his opinion the situation in Quebec was much improved, due largely to the movement amongst medical men for Dominion registration.

Under the order Notices of Motion, Dr. Magee submitted the following request from the Dental Association of New Brunswick:—

Gentlemen,—In compliance with a resolution passed by the New Brunswick Dental Society, I beg to advise you of the standard adopted and now used by the New Brunswick Dental Society as a preliminary examination to the registering in the Province of New Brunswick of dental students. The examination given is the matriculation examination of the University of New Brunswick, and embraces the following subjects: Latin, Geometry, Algebra, Chemistry, English Grammar and Composition, English Literature, Arithmetic, Geography, History (Ancient, Mediæval and Modern), Greek (as an alternative to French and Botany). It is the desire of the New Brunswick Dental Society that the D.D.C. accept this standard as will be explained by its representative, Dr. James M. Magee.

Respectfully yours,

(Sgd.) FRANK A. GODSEE,

Secretary.

Reports of the officers were then presented. The President's report read as follows:—

Since our last meeting, held two years ago, two things stand out prominently as requiring special mention. The first of these is the temporary withdrawal of Alberta from its affiliation with this Council.

When in June, 1911, I received notice from the representative of Alberta that the local Association had instructed him to send in his resignation, it gave me a shock, because it came like a bolt from the clear blue. Happily, however, my fears for the future of the Council were soon

allayed, for shortly afterwards an explanatory letter was received containing the information that the defection was but temporary and that, if the Council was willing, re-instatement would be applied for in October. In January of the present year the Alberta link was again welded, and I was glad to be able to quote "All's well that ends well."

The second matter of grave import to our Council was the question of inducing British Columbia to become affiliated. During the summer of 1910 I had a communication from Dr. W. Seccombe acquainting me of the fact that Dr. R. J. Reade was shortly to visit British Columbia to give expert evidence in a suit at law in connection with a dental registration case, and strongly urging me to appoint Dr. Reade plenipotentiary to urge the British Columbia Board to accept our D.D.C. Certificate. He stated that Dr. Reade would act for us on payment of his expenses and fees of a stated sum per day while working in our interests, the sum total of which would probably not exceed \$150.00.

I then wrote Dr. Reade, who corroborated the statements made by Dr. Seccombe. I felt that the Executive ought not to use the funds of the D.D.C. to pay the expenses of anyone on a mission of that kind, without consulting the whole Council, and I advised Dr. Reade accordingly, but at the same time I assured him that if his efforts proved successful, the British Columbia Board accepting our Certificate, the D.D.C. at its next meeting would vote him an honorarium, amply compensating him for any sacrifice of time spent on our behalf, and in any event, successful or not, he would receive compensation for time and expenses. Dr. Reade's letters seem to favour too much of the mercenary, though perhaps he did not intend them to be so, and tried to convey the idea that sentiment played a great part in the much-to-be-desired union. Personally, I felt that if I were even only friendly to the D.D.C. and happened to be within the boundaries of a Province which was not in sympathy, I should at least make mention of it in the hope that the dental profession of my country might take one step nearer the desired goal of Imperial Registration. I hoped that Dr. Reade would have read between the lines and temporarily place patriotic pride above the purse.

Dr. Reade, however, in November resigned the commission, giving as a reason his inability to remain in British Columbia after the trial, and I again urged him to do what he could in the matter and the Council would do itself the honour in voting him such an honorarium as would satisfy not only his purse but his professional pride.

Dr. Reade evidently did not mention the matter from the side of the D.D.C.

Recently I have been looking for replies sent to British Columbia dentists, asking for reasons why the Board of that Province is averse to accepting our Certificate. I wrote Drs. Verrinder and Minogue in the hope that if I could get into communication and had a statement *why* they opposed

affiliation, the ground could be cleared for argument with the prospect of a successful termination.

The silence that both these men maintain leads me to feel that it is a studied and concerted indifference, and that they will not allow themselves to be inveigled into any argument. As Dr. Reade wrote me he thought he could show the British Columbia Board where it would be to their advantage to become a member of the Council, and as Dr. Seccombe wrote me the British Columbia Board would accept anything Dr. Reade advised, it has seemed inexplicable to me that Dr. Reade could not say the one word in our favour. I asked him to write beforehand what he would advise the British Columbia Board to do and it would take but a short time to definitely set the matter during his stay in that Province. In the same connection I am led to believe that the the next meeting of the Quebec Association the Council of that body will take a decidedly forward step, and Quebec will then elect a representative of that Province.

Our Secretary will furnish us with a statement regarding candidates, finances, etc., etc., so no reference to them is necessary from me. I must refer, however, to the matter of matriculation standards. When the Council was formed the minimum standard of preliminary qualification was to be equal to that demanded by the General Medical Council of Great Britain. This standard has been criticised most favourably, and great respect has hitherto been accorded us for the exalted position we occupy in the dental world. Canada must not allow itself to be coerced into taking a step down. I trust, therefore, that there be no lowering of our standard. I also trust that the harmony that has hitherto characterized our deliberations may continue to prevade our present constitution to the lasting glory of our profession.

(Sgd.) J. M. MAGEE,

President D.D.C.

Moved by Dr. Woodbury, seconded by Dr. Bush, that the President's report be received and fyled. Carried.

Moved by Dr. Woodbury, seconded by Dr. Bush, that the action of the President in regard to sending Dr. Reade to British Columbia be sustained. Carried.

The Secretary submitted his report as follows:—

Gentlemen,—Since we met there have been very few incidents of an unusual nature to report in connection with the transaction of your business. The usual examinations, both regular and supplemental, have been held, the one for this year being now in progress.

In connection with the examination the leading difficulty (if such it can be called) experienced has been in connection with the matriculation. I am myself of the opinion that we would have had less difficulty had we not so abruptly established Class A. It has taken several years for the

students (new to dental law) to become acquainted with our rules, and as a consequence several misunderstandings have occurred.

Some months ago Alberta gave notice by wire of her temporary withdrawal from our agreement. This sudden action was made possible by their law, which required Alberta to recognize the D.D.C. Certificate as long as Alberta was represented upon the Council. Both the President and myself were advised that the withdrawal was temporary, pending a change in Alberta law. I am pleased to say that again Alberta is one of the agreeing Provinces.

I have been advised that Quebec has made considerable progress toward accepting our Certificate. Dr. Nolin suggests that it would be very acceptable to the Quebec Association if some member of our Council would attend their next meeting in the interests of the D.D.C. He also reports the Legislature of Quebec as now being favourable to the D.D.C.

Considerable correspondence has been had with regard to British Columbia, but as the President has had this in hand, I leave it with him to report.

From advices to hand, chiefly verbal, I have reason to believe that all of the agreeing Provinces have made splendid progress in the matter of uniformity of standard. In most of these matriculation in Arts is now required. The influence of the D.D.C. has been very effective in its assistance to the local bodies in this particular.

I would ask your attention to Section 37 of the Constitution. The first clause was adopted prior to the granting of progressive examinations. Is it your intention that each candidate shall be compelled to complete his examination at the first examination held subsequent to failure in one or more subjects? In this connection I might draw your attention to the number of Class A and B men who have now allowed one or more years to intervene before completing. In examination of 1910 forty-three candidates wrote on subjects; of these 12 failed on 13 subjects. Only one man wrote the supplemental; he passed.

In 1911 forty-one candidates wrote on 147 subjects; of these, eight failed on 10 subjects. In the supplemental of 1911 five candidates wrote on eight papers. Of these, two failed on three papers.

One of our candidates, Dr. Brett, removed to British Columbia before completing his examination. He had three papers to complete, and wished to write in British Columbia. Believing that would be a good opportunity to let the British Columbia profession discover our system, the President granted the right. I might say that the candidate failed, and has not been granted our Certificate. I have arranged for him to write again this year. While he failed with us, he at the same time succeeded with the British Columbia Board.

One feature worthy of attention is the fact that an entire change has come over Class C applicants. At first every man seemingly who should

not get this certificate was applying for it. Our persistent refusal to yield to them has had a splendid effect. They seem to have discovered how useless it is to apply. Lately only the very best type of men have sent in their applications.

(Sgd. W. D. COWAN,

Secretary D.D.C.

The Province of Ontario having submitted a proposed amendment to the Constitution, Dr. J. B. Wilmott addressed the Council in support of it.

The representative for Ontario, Dr. Abbott, then moved its adoption, but not getting a seconder, the motion dropped.

Moved by Dr. Abbott, seconded by Dr. Doyle, that the Secretary's report be received and adopted. Carried.

Moved by Dr. Woodbury, seconded by Dr. Doyle, that the incoming Executive be empowered to engage legal opinion upon our legal position as a body. Carried.

The Treasurer submitted the Auditor's report as his report.

Moved by Dr. Doyle, seconded by Dr. Bush, that the Treasurer's report be adopted. Carried.

The representative from Alberta reported upon the temporary withdrawal of Alberta.

Moved by Dr. Woodbury, seconded by Dr. Bush, that the editor of the Dominion Dental Journal be supplied with a few facts each month for publication. Carried.

Moved by Dr. Woodbury, seconded by Dr. Doyle, that sub-section B of section 37 be amended so as to read: "In all cases where a candidate has taken his final examination, has made an average of 75 per cent. in all written subjects other than such subjects as he may have failed in, not more than two subjects, by not more than five points in each subject, the Executive shall have power to return the papers to the examiners with a request that they re-read these particular papers to determine the correctness of the former rating."

And that section 37 be amended by striking out the words "Where they occur in the fourth and fifth line of the said clause."

It being an amendment to the Constitution, a two-thirds vote was required. The vote, being taken, resulted as follows:—Nova Scotia, yes; New Brunswick, yes; Ontario, yes; Manitoba, yes; Saskatchewan, yes; Alberta, yes.

Moved by Dr. Woodbury, seconded by Dr. Bush, that the application of the Royal College of Dental Surgeons re matriculation be referred to the Provincial Association of the agreeing Provinces of the Dominion for consideration and report, and that these Associations be asked to send the report to the Secretary of the Dominion Dental Council at once after the next regular meeting. Carried.

Moved by Dr. Woodbury, seconded by Dr. Abbott, that Dr. Clay,

of Calgary, be appointed examiner in Prosthetic Dentistry. Carried.

Moved by Dr. Cowan, seconded by Dr. Bush, that Dr. Fasken be appointed examiner in Physiology, Histology and Bacteriology, and Dr. Norman Ross examiner in Anatomy. Carried.

Moved by Dr. Doyle, seconded by Dr. Abbott, that section 15, clause B, be amended by striking out the entire clause and substituting therefor the following: "Satisfactory proof to show that the applicant has been a *bona fide* student of dentistry for a period of four academic years at a Dental College."

Moved by Dr. Woodbury, seconded by Dr. Bush, that clause of section 15 be amended by striking out the words "During which time he shall have received at least sixty-four weeks' actual instruction," and substituting therefor the words "Three academic years."

The above being amendments to the Constitution, a vote was taken, and resulted as follows:—Nova Scotia, yes; New Brunswick, yes; Ontario, yes; Manitoba, yes; Saskatchewan, yes; Alberta, yes. Carried.

Moved by Dr. Abbott, seconded by Dr. Woodbury, that sections 41, 42 and 43 be erased from the Constitution, as these are all provided for elsewhere in the Constitution.

The vote, being taken, resulted as follows:—Nova Scotia, yes; New Brunswick, yes; Ontario, yes; Manitoba, yes; Saskatchewan, yes; Alberta, yes.

The election of officers was then held, and resulted as follows:—For President, Dr. Frank Woodbury, of Halifax; for Vice-President, Dr. Harry R. Abbott, of London, Ont.; for Secretary-Treasurer, Dr. W. D. Cowan, of Regina, Sask.

Dr. James Loftus, 198 Spadina Ave., Toronto, succeeded in capturing one of the largest moose taken out of New Ontario this season. It has a beautiful head, with a 52-inch spread, quite symmetrical and having 22 points. This antlered monster was captured single handed, without either guide or hunting partner and within 3 miles of Ruel, on the C.N.R. Such sport is within reach of the majority of the dentists of Ontario and it is not at all too strenuous, as good accommodation can be had at camps on the railway.

Dominion Dental Journal

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No. 11

ADVANTAGES TO DENTISTRY WHEN TAUGHT IN A UNIVERSITY

To begin with, all education is now admitted to be the duty of the State. At one time those who wanted an education were expected to pay for it. Not so to-day. For a long time Universities and the State refused to give a professional training. This is no longer the case. Teachers, physicians, farmers, veterinarians, engineers and lawyers are partially educated at the expense of the State. There is no good reason why dentistry should not receive similar aid and recognition.

The tendency at the present time is for all dental schools to become departments of Universities. The Royal College of Dental Surgeons is the only school of dentistry in Canada owned by a private corporation. In both England and the United States the privately owned dental schools

are rapidly passing away. Most professional education must be undertaken as a private enterprise at first, but as soon as it has proven its place, then the State should assume control.

The chief reasons for Universities or the State teaching any branch are responsibility, economy and efficiency.

Before a University or State will undertake the teaching of dentistry or any other branch of education it must recognize its responsibility. If Toronto University undertakes to teach dentistry it will be because it feels that dentistry has made a place for itself as one of the needs of the people. In the minds of a great many people the standing of the profession would be very much enhanced by direct University connection. The enhancement will only in the long run be in proportion to the height of the standard reached. But there is no doubt that most people take us at our own valuation, and if we are graduates of a State University and not a private school, we think better of ourselves. There is truly as much difference between the graduate in dentistry from a State University and one from a private corporation as there is between a graduate from the latter and one from a private dental office. There is more uniformity in standard in a State University.

The next most important reason for Toronto University teaching dentistry is one of economy. There is now a great organization established and running; the addition of another department does not call for another President, Bursar, Registrar, overseer of buildings, etc. The Faculty of Dentistry would drop into its place among the rest with little or no additional cost, while at present thousands of dollars are spent in administration and officering of the dental school. Again, many of the subjects on the dental curriculum can be better and more cheaply taught if taken where the equipment is at present in some of the other departments. It has been recognized for years that teaching dentistry is expensive and will increase rapidly in the years to come. Students' fees are now becoming prohibitive. The State will demand more dentists before many years, and our College cannot graduate them without lowering the standard, while the University could keep up the standard and at the same time keep down the fees. Another matter dentists in Ontario do not realize. A dental school cannot be economically run without at least 250 students. At present fully fifty of the 220 students at the Royal College of Dental Surgeons come from west of Lake Superior, and inside of five years the Universities of the West will have established dental departments, which will leave the Royal College of Dental Surgeons a burden to the profession of Ontario as well as a doubtful pride.

It is in the department of efficiency that the University can far excel in the management of the school and the character of the graduate. The University has experts in every department in educational management, men whose whole lives have been given to the management of educational

institutions. Our Board did well in establishing, maintaining and managing a dental school up to a certain point, but even their most staunch friends and admirers or they themselves would hardly say they know as much about managing an educational institution as the President of the University and the Senate, even if they were living in Toronto, but when they must, by the very nature of their appointment, never see the place in working order they must admit their helplessness. To hear reports but once a year about what is going on at the school is not sufficient data upon which most men can dictate the policy for a whole year to come.

A POSSIBLE BASIS OF AGREEMENT BETWEEN THE UNIVERSITY AND THE ROYAL COLLEGE OF DENTAL SURGEONS.

Pass the School of Dentistry to the University as a going concern.

1. University to assume all the financial obligations of the Royal College of Dental Surgeons in regard to the building and school.

2. University to accept the present faculty and staff upon present basis of salary and positions for a period of one year from date of signing agreement.

3. The University to establish the School of Dentistry as a Faculty of Dentistry which shall bear the same relations to the University that other Faculties of the University do.

4. For a period of five years the University in consultation with the Board of Directors shall agree upon the curriculum of studies.

5. The University should use the name Faculty of Dentistry, Royal College of Dental Surgeons, Toronto University.

6. The University shall continue and add to the present library and museum in the School of Dentistry.

7. The University shall for all time provide a suitable place of meeting for the Board of Directors in the Dental School building and provide such other necessities for meetings, such as desks, vaults, etc., as may be thought necessary, free of charge.

8. The University shall co-operate with the Board in every effort to maintain a high dental educational standard.

9. The handing over of the School of Dentistry to the University shall in no way interfere with the right of the Board to discipline its members, nor shall the University in any way dictate the standard of educational requirements of those entering the profession.

10. The present method of joint examination shall be continued only so long as the Board deems it wise.

11. The Board of Directors shall give to the University all property, buildings and equipment at present in their possession used in the teaching of dentistry.

12. The Board shall henceforth cease to teach dentistry or establish or give help or countenance to any teaching of dentistry other than that of the Toronto University.

13. The Board shall not accept for examination candidates for a license to practice dentistry in Ontario who have not graduated from the Faculty of Dentistry of the University.

CONSTITUTION OF THE CANADIAN DENTAL ASSOCIATION

At the Hamilton meeting of the Canadian Dental Association it was suggested that the Dominion Dental Journal publish the Constitution of the Association. This suggestion was made because the members were not aware that a Constitution existed.

In this issue appears the original Constitution as drafted in 1902 at the Montreal meeting, also suggested amendments because of new conditions arising at the Montreal meeting in 1906, also a revised Constitution passed at the Ottawa meeting in 1908.

By this Constitution, though very short, full provision is made for the organization of a meeting in any city; also the names of the committees are suggested. It will be found that there will be a majority of the whole Executive in the city in which the meeting is to be held, and that any Province having an officer has not a Provincial representative; also that the Second Vice-President is only appointed when there are no other officers in the city in which the meeting is to be held.

We would suggest that the Executive Committee have a number of the Constitutions printed, so that in future there will be no doubt of a Constitution being in existence.

BI-ANNUAL ELECTIONS OF THE R.C.D.S

- District No. 1—W. C. Davey, only candidate nominated.
- District No. 2—G. C. Bonneycastle, only candidate nominated.
- District No. 3—W. C. Trotter and C. A. Kennedy nominated.
- District No. 4—Donald Clark, only candidate nominated.
- District No. 5—W. M. McGuire, only candidate nominated.
- District No. 6—Wm. Bruce, only candidate nominated.
- District No. 7—H. R. Abbott, only candidate nominated.

Reviews

Oral Surgery, a text-book on general surgery and Medicines as applied to Dentistry—By Stewart Leroy McCurdy, Professor of Anatomy and Oral Surgery, School of Dentistry, University of Pittsburgh; Chairman of Section on Stomatology, American Medical Association, 1910, 1911, 1912; Orthopedic Surgeon, Presbyterian and Columbia hospitals, etc., Pittsburgh; Author of "Manual of Orthopedic Surgery," "Anatomy in Abstract," "Emergencies in Abstract," "Arthrosteopedic Surgery," with two hundred and twenty-eight illustrations. D. Appleton & Co., New York and London, 1912.

This is a work of 400 pages, being the first of a series of text-books which have been planned by the Commission on Text-books of the Institute of Dental Pedagogics. It is intended that the entire subject of dentistry as it should be presented in a standard dental college, shall be covered in a definite number of books, each book including only such subjects as properly belong to it. The type, the arrangement, the number of pages, the illustrations and the general make-up follow the lines laid down by the commission. The first part of the book discusses principles of surgery, the second part Oral Surgery and then comes the appendix and questions on Oral Surgery. This work is well illustrated and much better in general make-up than many which have preceded it. It does not pretend to cover all the subjects of Surgery, Medicine and Dentistry. One or two features might be worthy of special mention: the relation to chronic inflammation in the mouth such as is caused by decaying teeth, pyorrhea, tobacco, alcohol, syphilis, bear upon the subject of Leucoplakia. There is a great improvement in the description of some minor diseases of the mucous membrane. The author with commendable frankness admits that diseases of the antrum are frequently very difficult to treatment, in fact, he admits that when the antrum is once opened its complete recovery is very doubtful. The chapter on "Fractures of the Jaw" is very good, many of the obsolete methods have been left out, while some splendid illustrations of new methods are presented. Altogether, the subject is treated more from the dentist standpoint than in its predecessors.

Dr. Campbell, R.C.D.S., 1912, has been appointed school dentist to the parish of Govan, Glasgow, Scotland. Dr. Campbell's duties begin December 1st, 1912. By that time he expects to have two fully equipped clinics running.

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Original Communications

NEW METHODS IN CROWN AND BRIDGE WORK

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Read before Canadian and Ontario Dental Associations, Hamilton, June, 1912.

Mr. President and Gentlemen,—I wish that I had the eloquence of your man Thornton, or that dearly beloved countryman of yours who is on his way to Australia, Dr. C. N. Johnson, in order that I might express to you the pleasure I experience in being your guest upon this occasion. I have not been in Canada very often, but I know so many of the boys present that I am already beginning to feel at home.

The full extent to which the application of the casting process may have revolutionized the practice of dentistry is, of course, difficult to determine, but it is safe to say that its influence has been and is now being felt to a greater or less degree by even the most obscure dentists in the most remote districts.

Whether all who are now doing casting in some form or other are familiar with or will concede its revolutionary influence, and the marked advancement made possible by its application, or not, may be a question; but that at least a very large percentage of dentists are doing casting, and that they are doing better work, and doing it with infinitely greater comfort to their patients and with the expenditure of less nervous energy on their own part than they formerly did, there can be no question. That some operators are much more enthusiastic over its possibilities than others, and that some are getting much better results than others is also unquestionable, and is as interesting as it is true.

This, however, is but a natural sequence, and should be expected in any field of effort in which former accepted practices and methods of long standing become so completely revolutionized—supplemented, if you please—in so short a period of time; where the pedestals upon which the cherished reputations of so many prominent practitioners were built have been made to crumble and totter almost in a day; where old and young must begin anew and alike, and where the application of this newer mode

of procedure and its practicability must necessarily be tinged with a saturated solution of personal equation.

From the beginning, however, it has been interesting to note that those who were early to grasp the possibilities of casting and, hence, who have been and are still doing the most of it, are the most enthusiastic over it, and, therefore, does it not naturally follow, by the same rule of thumbs, that those who were first to grasp and accept its wonderful possibilities, who have been and are still doing the most of it, and who are most enthusiastic over it, are also the ones who are obtaining the best results?

While it may be true that the proportion of those who ever attain to the very highest achievements in any mechanical pursuit is not a large one, still I am of the very firm belief that the casting process has afforded an opportunity for raising the standard, and increasing the percentage of uniformly good results; and, in the light of our present achievements, that this standard will become higher and higher in proportion as we recognize our own personal limitations, and realize the full scope of the possibilities of this process.

All who are sufficiently honest with themselves as to analyze and recognize their own limitations will not expect a mechanical process, or a machine of any make or kind, to adjust and adapt itself to the varying and intricate demands of an exacting line of work, unless the process is followed, or the machine operated, with an average degree of human intelligence, and those who fail to recognize this are surely destined to meet with failure.

Thus it is more than probable that many may have failed in attaining to the heights of even average success simply because they *expected* too much of the process involved, and *exacted* too little of themselves, but those in this class never become enthusiasts, and those who never become enthusiasts never become experts, in any line.

Enthusiasm, expertness and all that goes with, to make for, and insure, success in the application of any mechanical process, can, after all, come only from the "man behind the gun," and hence the operator who aspires to such must be willing to acknowledge and contribute his share. And in this instance his share is in the form of ammunition, and the ammunition now needed most of all is *correct and accurate technique*.

While the factor of personal equation will perhaps necessarily demand a more or less different technique for each and every operator, yet with each the most scrupulous attention to details, and the utmost of accuracy is necessary; and as such a technique is to be acquired only at the expense of time, thought and energy, it is scarcely purchasable, nor may it result from delegating important parts of the work to laboratories, or to inexperienced or unskilled assistants, as is a common practice.

When the average operator realizes these essentials to success, then the average operator may reasonably hope to rise above the average, and

to achieve success in the application of the casting process, and as he appreciates them will he also find the field of usefulness broaden, and the possibilities become more and more unlimited.

If there were, however, no field to which the casting process may be applied other than the one which embraces the filling of teeth, let me ask you what a long-felt want would it still supply; what a broad field of usefulness would it occupy; what a priceless advancement would it mark in the preservation and restoration of the teeth, since it is now generally conceded that the inlay affords a better, quicker, less painful, and probably, on the average, more permanent character of operation?

Granting all of this to be true, however, the limitations of this process have by no means yet been reached. Indeed, it seems that it is still only in its infancy, and that the field of its usefulness as applied to all other phases of practical dentistry is as broad and far-reaching as is the degree and character of success already insured in the filling of teeth.

While this is undoubtedly true, to a greater or less extent, as applied to the whole field of dental prosthesis, it is particularly true as applied especially to the subject of crown and bridge work.

But a few—a very few—years ago this line of our work, which many of us are now pleased to designate and dignify as a “specialty,” was but an indeterminable mass of empirical details. Almost every dentist had his own ideas, and his own methods, and each differed from the other to such an extent as to confuse the teacher, and bewilder the beginner, in every respect and direction except one—the display of gold.

For many years patients wearing crown or bridge work, however limited or extensive in character, were involuntary advertising mediums for dental jewelers; were forced to display shocking evidences of a handicraft which, while useful, perhaps, was usually far short of art, and always more or less repulsive.

These evidences, I am sorry to say, may still be observed, but fortunately not to the same extent. As a profession, we are beginning to strive for higher ideals in the artistic phase of our work, and in this respect we are aided materially by the demands of an ever-increasing degree of culture on the part of our patients.

Since porcelain has always been and is still the one substance which most closely simulates nature, and therefore best meets the requirements, the combined esthetic ambitions on the part of the dentist and esthetic demands on the part of the patient, must lead one to conclude that in an effort to satisfy each *more porcelain* and *less gold* must be used.

While this was recognized many years ago, still the inherent element of structural weakness so characteristic of porcelain, and so often learned from sad experiences, together with the knowledge that cosmetics was but one requirement, and that in the construction of all forms of crowns and bridges the actual mechanical requirements of strength and accuracy of

adaptation must necessarily receive first consideration, it is no great wonder that cosmetics was accordingly sacrificed.

If it were not, and if it is not, possible to obtain both of these requirements at one and the same time, then cosmetics should be placed second to, or sacrificed for the purely mechanical, but the possibilities of *casting* offer opportunity for obtaining all of the combined requirements to the very highest degree, and hence its application may be made to practically revolutionize all of our former methods.

This is possible because the casting process, *skillfully utilized*, insures, first, accuracy of adaption, and, second, a maximum of strength with a minimum of gold; and in proportion as the amount of gold necessary to insure strength may be decreased, the amount of porcelain may be increased. Thus, if our work be properly constructed, less gold and more porcelain may be safely and successfully used, and the suggestions which I have to offer you along these lines are based entirely upon the theme of more porcelain and less gold, with equal and adequate strength.

Such manifestly desirable advantages are now to be obtained by means of a more general use of all-porcelain teeth instead of the ordinary thin facings, combined with a skilful application of the casting process.

You will probably agree with me in that this type of tooth is preferable for single artificial crowns, because it affords better form, better color and greater strength than are possible to obtain from the use of facings. Also that an all-porcelain tooth is better for bridgework because the presence of an occlusal surface of porcelain instead of gold,—on any or all of the posterior teeth,—is advantageous not only for cosmetic and hygienic reasons, but for *actual masticatory* purposes as well.

These advantages are so evident that the more esthetic operator has been forced to look and hope for some form of tooth; and some method of application which would eliminate the inherent weakness of thin facings, and the objectionable features incident to their use.

To overcome the shortcomings of the so-called "Richmond" crown and of the ordinary bicuspid and molar dummy with porcelain facing and gold cusps, the advantages of some form of interchangeable or replaceable all-porcelain tooth, more closely simulating the form and color of the natural teeth, were early recognized. As a result of this recognition, many types have been introduced, but until very recently most of them have been of the thin facing variety, and applicable to the anterior teeth only.

While the all-porcelain tooth, such as the Davis, Logan, Justi and similar crowns, has always been recognized as being the nearest approach to an ideal substitute for the natural teeth, yet they were not originally designed to meet the present requirements of crown and bridge work, and hence their use has been confined to that class of cases where more or less temporary results were all that was expected or demanded.

If the esthetic and hygienic advantages possessed by this type of tooth, however, could be combined with those of exact adaptation, and uniform and adequate strength, and if to these might be added the further advantages of being cemented to the basic structure instead of soldered, and of being replaceable and more or less interchangeable, it is evident that our efforts would be a nearer approach to the ideal.

In my opinion, the attachment of porcelain teeth, or even facings, to the metal structure by means of soldering, or even of *direct* casting, is wrong. It is a wrong principle, because the porcelain is subjected to a degree of heat which must endanger its structural integrity and influence the preservation of its color; because the tooth or facing is thus attached at a single point only, and in a stiff and rigid manner, and, therefore, being friable, it is more likely to fracture under the stress of mastication; and, further, because, in the event of accident, no favorable opportunity for repair or replacement is usually afforded.

I think you will also agree with me, therefore, in that the elimination of these objectionable features must necessarily constitute an improvement, and that such an improvement is to be obtained by the use of replaceable teeth attached to the supporting metal structure only by means of cementation.

An experience of many years has proved that this means of attachment is reliable in proportion as the adaptation of the metal to the porcelain may be close and accurate, or, in other words, in proportion as the porcelain may be "boxed up," protected and supported. It is stronger when so attached, because it is not subjected to any degree of heat, and because the attachment is further supplemented by the adhesion of cement over the entire surface of the porcelain; and, being so attached, are, therefore, less likely to become fractured. Furthermore, the color is never changed; those dark blue marginal outlines so invariably present, and due to the penetration of saliva between backing and facing, are absent; and opportunity and facility for replacement in the event of accident always present.

As I have previously stated, these possibilities and advantages are to be adequately obtained only in some form or type of tooth which presents as much porcelain as possible, this porcelain not being weakened by the presence of metal pins nor by the provisions for retention, and which, therefore, possesses a maximum of strength; which is of natural form, more or less universally applicable, and which will need but a minimum of grinding for affecting the desired and required adaptation.

This latter feature, as applied to the basal or retentive surface, is essential, because in proportion as a given form of porcelain tooth will require but little or no grinding upon this surface in effecting its adaptation to the requirements of the individual case, may it be expected to be replaceable or interchangeable.

These combined advantages, I believe, are to be obtained in a form of tooth suggested by your essayist, and now known as the "Goslee interchangeable crown and bridge tooth." (Fig. 1.)

It will be observed that these teeth, as now made, are of natural form; that they possess the splendid strength and color characteristic of the Consolidated tooth bodies; that they are adapted to single crown work where any form of metal base is used, as well as to intermediate teeth, or "dummies" for bridge work; that they afford a minimum display of gold, and require but a minimum amount of grinding, and that, with a sufficiently large variety of molds, they should be almost universally applicable; also that they are strongest where the greatest strength is required; and that they offer ample opportunity for secure retention to the supporting base or structure.

A further advantage made possible by the use of replaceable or interchangeable teeth, which applies particularly to especially difficult cases, is to be obtained by making duplicates, and while it is true that any form of interchangeable tooth is far less likely to become broken from the stress



Fig 1

of mastication, yet the making of duplicates coincidentally with the initial construction requires but little time, is always a source of inestimable protection to the particular patient, and affords unlimited relief and satisfaction to the dentist. It is, therefore, a safeguard which might be observed often and profitably by everyone whose necessarily small fees do not render it prohibitive.

In all instances, however, whether duplicates are made or not, the color number and mold number of each tooth used in every case should be recorded on the card or ledger sheet, and thus made a permanent part of the record.

Because of these advantages and for these various reasons, I firmly believe that only some form of interchangeable tooth should ever be used in single crowns, or in "fixed" bridge work, of any type, if the best results and highest possibilities are to be attained in our efforts.

METHODS OF APPLICATION AND PROCEDURE.

In addition to such desirable improvements as may be achieved by the use of teeth of this character, the introduction and application of the

casting process has placed this field of our effort upon a more systematic and practical basis, as an evidence of which permit me to call your attention to the methods which I am now generally employing, almost to the complete exclusion of all other and former procedures, and which I am pleased to consider under the caption of "Newer Methods."

SINGLE CROWNS.

For the ten or twelve anterior teeth, or all teeth within the range of vision, where porcelain is demanded, the all-porcelain replaceable or interchangeable crown, *with cast base*, and with or without a band, as the requirements may indicate, is used in a very large percentage of cases. It is undoubtedly the strongest, most artistic, and most universally applicable type of substitute for the natural tooth, and in all respects is second only to a skilfully adapted "jacket" crown. Indeed, in the hands of the average dentist it is better, more quickly and easily made, and possesses an advantage even over the latter in that immediate replacement in the event of mishap is possible.

A TECHNIQUE FOR PORCELAIN CROWNS WITH CAST BASE.

In the construction of all forms of porcelain crowns with cast bases much difficulty has heretofore been and is now being encountered in molding the wax to a close adaptation to both the root-end, *particularly at the periphery*, and at the base of the crown, and at the same time have this wax sustain the dowel or dowels in the proper position to insure correct alignment.

These essential features are usually so uncertain and in some instances so difficult and so unsatisfactory as to have caused me to devise and suggest a technique which eliminates any such uncertainty, which insures accuracy, which is applicable alike to all cases, whether a band is required or not, which makes the fitting of a crown to the most difficult root as simple as to the easy one, which relieves the patient of any discomfort whatever, and which, when used in connection with the Goslee tooth, has proven the most satisfactory method of crown construction I have ever followed.

In the various methods now generally used and advocated,—and each operator has his own,—good, accurate, reliable results are difficult to obtain, because the very plasticity of wax of any kind makes it possess a tendency to *spread* when subjected to the pressure necessary to mold it to a clean, close adaptation.

This inherent tendency has made it practically impossible for me to obtain a sufficient degree of accuracy of adaptation to the root-end with wax alone. Any inaccuracy or uncertainty, however, may be entirely overcome, and uniform and absolute accuracy obtained in all cases by first adapting a cap of thin pure gold or platinum to the root-end.

If this is carefully done, the adaptation thus obtained will always fit the root better than any efforts resulting from the molding of wax alone, followed by the use of any investment material now procurable, and will require no finishing whatever after casting.

Also, such a procedure reduces to a minimum the possibility of any change of form which may result from the warpage or shrinkage of the gold or alloy used in casting, and this is a very important consideration.

While a good adaptation of this cap may be effected by burnishing directly to the root, the best, most accurate and least painful results are

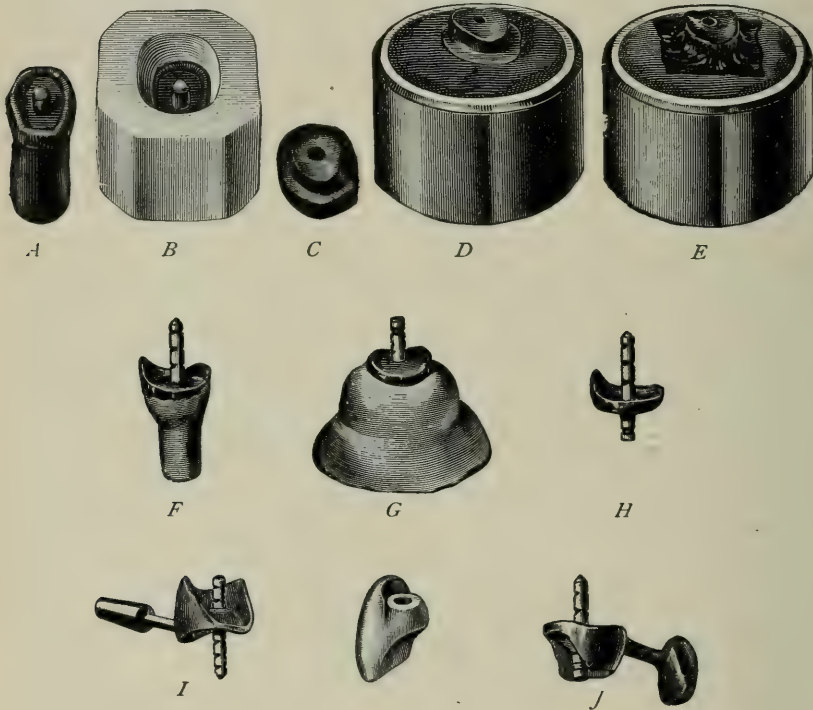


Fig. 2

always to be obtained by *swaging*. This procedure necessarily involves the impression and die, or indirect, method, as illustrated in consecutive steps in Fig. 2, and in which the technique involved, in sequential order, is as follows:

First: Prepare the root in the usual manner, as indicated for any type of dowel crown, and where a full or even partial band is to be used, all enamel must, of course, be removed.

Second: Adapt a base of thin pure gold or platinum to the root-end. Platinum has some advantages, and may be used if desired, but pure gold is more easily and accurately adapted.

All of the required accuracy of adaptation may be best accomplished by taking an impression of the root-end in modeling compound, Fig. 2, A, investing it in plaster, B, and making a die of quick-setting amalgam or cement. An amalgam die is better than cement, because of being much more definite and reliable, though it, of course, requires more time. When the die has been obtained, it should be trimmed around the periphery with a fissure bur until the root-end is freely exposed, C.

Third: When the die has been made, it should then be mounted in the ring of any of the swaging outfits, with modeling compound, D, and then with the soft rubber plunger swage a cap of about 38 gauge pure gold, E.

Where the basal end of the root is smooth and flat, and where no band at all is desired, this cap may, of course, be successfully adapted by burnishing directly to the root-end, but, where a full band or any portion of a band is deemed advantageous, or necessary, or where the surface of the root is concaved or irregular, the adaptation is always to be the best obtained by swaging.

The use of a cap previously adapted by swaging or even burnishing is advantageous, not only because it overcomes warpage and shrinkage, and because it insures a better fit of the finished crown to the root, but also because it facilitates sustaining the proper relation between the root, the dowel and the porcelain crown.

Fourth: The next step is to select a tooth of suitable size and proper color. The selection of the tooth for the case at hand is best made by having a tray of sample molds, and when one of proper size and form has been selected, simply record the formula. Thus, for example, the record slip would read, "Upper Right Lateral, Mold 51, Color 65." If care is exercised in selecting just exactly the proper size and shape, practically no grinding whatever will be required.

In this connection, it would be better to select a formula just a trifle too small than one too large. If the exact size is not obtainable, small additions in length or width may be easily made in one bake, using any of the lower fusing bodies. Such additions are better than selecting a tooth which is too large and having to grind it, and little or no grinding should be resorted to, as these teeth are replaceable or interchangeable only in proportion as they may be used without grinding.

The formula of each and every tooth should always be permanently recorded at the time of making the selection.

In the absence of sample molds, an impression should be taken in wax or modelling compound, and a model made in plaster-of-Paris. The selection may then be made upon this model, but greater accuracy is to be obtained in the use of sample molds directly in the mouth.

Fifth: When the tooth has been selected, the canal should be enlarged to receive the dowel, which should be of a length which will enter the

root to a sufficient depth and then engage and hold the tooth in its proper relation to the root.

In single-rooted teeth a slight enlarging of the canal, or a slight bending of the dowel, or both, will usually sustain the tooth in its proper alignment, and in upper first bicuspidis one dowel is usually all that will be required. This, however, should always be placed in the *buccal* canal.

Sixth: Iridio-platinum or clasp-metal dowels should always be used for cast work. The dowel should be round, threaded or notched, and not smaller than 14 gauge, though the end entering the canal should, of course, be *tapered* to conform to the size of the root. In casting to clasp-metal dowels, care must be exercised not to overheat the flask just before casting. Those who cast into red-hot flasks (which is a mistake) often find that their clasp-metal dowels are melted and absorbed into the casting, due only to an excessive heating of the flask in melting the gold. If the casting may be made into a flask only moderately warm, however, these alloys will withstand contact with molten 22 karat gold, but otherwise iridio-platinum pins and dowels should be used.

Seventh: When the dowel and tooth have been adjusted, the cap should then be placed in position on the root, perforated to receive the dowel, and the latter, in position in the crown, forced to place on the root. The tooth should then be removed and the relation between cap and dowel sustained with wax or temporary stopping, F. The two should then be removed from the root and invested with a very small bit of soldering investment material (G), and when this is hard, the dowel should be tacked to the cap with a small bit of 22 karat solder, as a means of insuring their permanent relation (H). Cap and dowel should then be adjusted to position on the root and finally trimmed and burnished to the desired accuracy of adaptation.

Eighth: The crown should then be ground to a close joint along the labial or buccal edge, and all other requirements of adaptation completed. When these have been observed, the base of the crown should be painted with glycerine or thin oil, a small piece of soft clean wax placed on the cap, and the crown then forced to its exact position in relation to the cap. Crown, dowel and cap may now be removed from the root and the space between the gold cap and porcelain tooth completely filled with melted casting wax, preferably of a hard character. When thus filled and contoured, all surplus wax should be nicely trimmed away, and the porcelain crown then carefully loosened and detached, which is made possible and easy by the presence of the lubricating oil.

No. 30 gold foil placed in direct contact with the porcelain tooth just before adjusting the crown to position on the cap may be used as a means of facilitating the removal of the crown from its base, instead of a lubricant, with good results.

When the porcelain crown has been loosened from the base, (I.) but before it has been removed, the sprue-former should be *securely* attached to the *thickest* part of the wax. The crown may then be removed, the base invested and cast, always using a good grade of about 22 karat gold for the casting.

By a "good grade" of gold I mean that all gold used for this purpose should be at least 22 karat, and clean and free from contaminating metals and alloys. This will require that all scrap used must be previously melted and refined before attempting to cast it, if good results are to follow.

When the casting has been made (J), it should be cleaned in acid and finished. If duplicates are to be made, a crown of the same mold and color should now be ground to fit the cap, after which the original should be cemented to the base, and the crown subsequently finished.

Ninth: Whenever it is absolutely impossible to have a single dowel fit the canal, and at the same time support the crown in proper position, the surplus end projecting through the cap should be cut off close to the surface, leaving just a sufficient projection to insure strength. A separate short dowel (such as is made for dummies for bridge work) may then

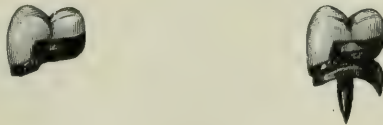


Fig. 3

be used to support the crown. This should be placed in position in the crown, any unnecessary surplus cut off, so as to permit of proper alignment, the porcelain then lubricated, and the relation sustained in wax, as previously indicated in cases where a single dowel is used. This separate dowel of a given size is usually better than to attempt to mold wax and make the sustaining post as a part of the casting.

Tenth: In cases where the space between the cap and the base of the crown is very small, or where it may not be convenient or seem necessary to cast the base, good results may be obtained with solder.

In such cases the porcelain tooth should also be backed up with about 38 gauge pure gold by burnishing or swaging; the crown and backing then placed in position in relation to the cap, the porcelain removed, the case invested, and the space between cap and backing then filled with 22 or 20 karat solder. Fig. 3.

This method is particularly useful in very short bicuspid, but where there is sufficient space to permit of casting, the results are perhaps more uniformly strong.

This procedure reduces crown construction to a definite system, a system which is expeditious, which is simple, which insures a more or less

perfectly adapted base, obtained alike in all cases without the slightest discomfort to the patient. Where a full or even partial band is desired, this latter feature is rarely possible when *burnishing* directly to the root-end is attempted.

For single crowns a slight lingual and approximal band is usually all that will be required. This strengthens the attachment between crown and root, and precludes the possibility of subsequent fracture of the root—for which purposes a band is usually used, but in all cases where the crown is to be used as an abutment piece for bridgework a *full* band should remain.

* * * * *

The construction of a crown along these lines usually involves but three short sittings, and the best results are to be obtained by doing all of the work directly in the mouth. At the first sitting the root is prepared, the root impression taken, the mold number and color selected, and a temporary crown mounted. This latter feature is desirable as a means of packing the soft tissues away to afford and insure a free exposure of the root-end at the next sitting, as well as to relieve the patient



Fig. 4

of the temporary embarrassment. The amalgam die having been made and the pure gold disc swaged and tooth selected *in the meantime*, at the second sitting the cap is fitted to the root, the dowel and tooth adjusted to the requirements, the dowel then soldered to the cap, and the relation between the tooth and cap secured with casting wax. The base is then cast, the tooth cemented to place, the crown finished, and the final mounting made at the third sitting. Several typical crowns constructed along these lines are illustrated in Fig. 4.

GOLD CROWNS.

For second and third molars—and even first molars, when the presence of gold is not objectionable—the cast gold crown affords results far in advance of anything heretofore obtained. In the construction of gold crowns by the casting process, however, the fit or peripheral adaptation is, because of the spreading tendency of wax, *always best obtained* by previously fitting some form of band to the root and then casting directly to it.

When an exaggerated contour is *not* required, and it seldom is, the band may be made of 28 gauge, 22 karat gold, and fitted and contoured in the usual manner. When in position on the root, casting wax is then molded to the end of the root inside of the band, and this procedure followed by an imprint in the wax of the opposing teeth in all of the movements of mastication.

After the band has been removed, its interior should be filled at once with casting investment material, and the occlusal surface properly carved, after which it may be invested and cast, using for the casting the same grade of gold of which the band was made. (Fig. 5.)

If the band is thoroughly clean before investing, and the gold to be

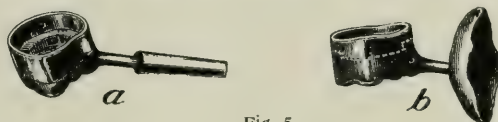


Fig. 5

cast is of good quality and highly fused before casting, a good physical union will usually result, but if it does not, a small bit of 22 karat solder placed inside at the immediate joint will insure the same.

A thin disc of platinum foil placed inside of the band and over the end of the root just previous to molding the wax will insure a smoother surface, and therefore a better seating of the finished crown after casting, than is to be obtained from investment material alone.

Where an exaggerated contour is desired, the best results are probably to be obtained by first closely fitting a platinum band, about 32 gauge, to the root, trimming this even with its occlusal plane, and then soldering a



Fig. 6

top to it, thus completely boxing up the end of the root with a close-fitting platinum cap. An impression and bite may then be taken, and when the models are obtained, all of the form and contour desired may be made with wax, and the casting made directly to the platinum cap. Fig. 6.

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These general types of porcelain and gold crowns will meet the requirements of single crown work in a very large majority of cases, and the results are far more accurate than are to be obtained by any of our former methods.

FIXED BRIDGEWORK.

In fixed bridgework, which constitutes only an assemblage of attachments and intermediate dummies, our work may also be simplified,

(because three general types of attachments and three general types of dummies will be found to meet the requirements in an exceedingly large percentage of cases.

ATTACHMENTS.

The methods of obtaining attachment to the supporting teeth or roots embrace, first, the *porcelain replaceable dowel crown with cast base*, as applied to the *roots* of anterior teeth, or when it is impossible or inadvisable to preserve the natural crown; second, the *inlay*, when the attachment is to be made to the *crown* of a natural tooth, which is good practice when the remaining natural crown is sufficiently strong; and, third, the *gold crown* for the molar teeth when the use of an inlay is for any reason not indicated.

As previously emphasized, wherever a dowel crown is to serve as an attachment for bridgework, a narrow band should always be used. In my opinion, this is absolutely essential because of the additional strain to which the root is to be subjected, and as a means of insuring permanency and precluding fracture.

When an inlay is to serve as an attachment, the cavity preparation is, of course, exceedingly important, and some form of post, or posts, should always be used to insure stability, and as a provision against the inlay becoming loosened by the strain and possible torsion to which it is to be subjected.

The general applicability of the inlay as an attachment for bridge-work has been a subject of considerable discussion ever since casting became an accepted practice. That it will serve the purpose as well as, and in some respects even better than, a full crown there can be no doubt, providing its adaptation and stability are insured.

The former depends, first, upon adequate and proper cavity preparation, and then careful technique in making the inlay; and the latter depends upon the use of a proper alloy in casting, and upon pins or posts of some form, for the reasons mentioned.

Wherever the walls of the supporting tooth are sufficiently strong to insure permanency; whenever a suitable cavity may be properly prepared, the inlay, well-seated and securely anchored, and made of a hard alloy, such as five per cent. platinum in pure gold, coin gold, or 22 karat gold, I am of the impression that such an attachment is often better than a full crown, because of the absence or possibility of gingival irritation, such as is so often present where the latter is used, and especially as applied to the anterior teeth.

The cavity preparation for such inlays does not differ essentially from that for a simple filling, excepting that buccal, lingual and cervical margins

must be so extended as to carry the margin between tooth and filling beyond any actual contact of the artificial tooth to be supported by it, in order that each and all of these margins may be exposed, for prophylactic reasons.

"DUMMIES."

As dummies for fixed bridgework, three general types will answer the requirements in all classes of cases.

First: The all-porcelain replaceable crown and bridge tooth with cast backing is adapted to all positions in the arch where the conditions of absorption and occlusion will permit their use, and such a tooth is undoubtedly the ideal form of artificial substitute.

In the use of this type of tooth in all cases in the upper arch where

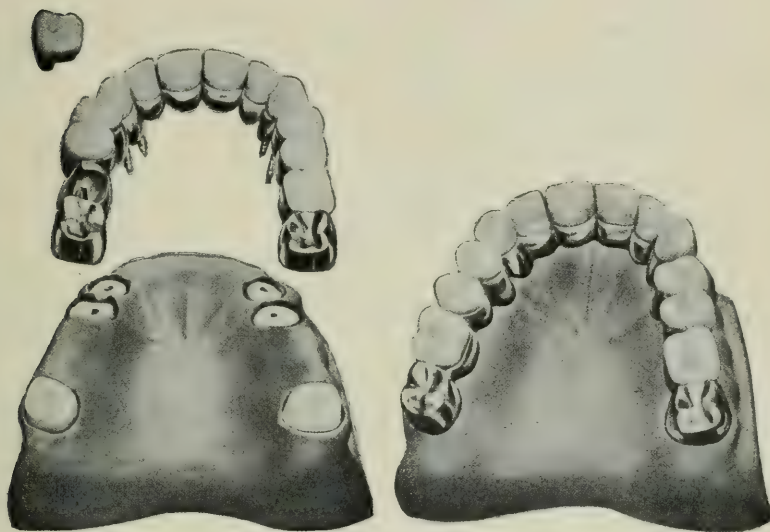


Fig. 7

complete absorption has already taken place, the most sanitary form of structure is usually to be obtained by molding the wax so as to restore or approximately follow the lingual form of the tooth, but tapering down to a narrow saddle at the point of contact with the soft tissue. As a rule (and notwithstanding the opinions of some), wherever the adaptation is good, such a type of construction will be found to be far more sanitary than the usual recesses, shelves and pockets so common in the ordinary methods.

In the formation of this type of saddle, the desired results may be best obtained by first burnishing thin pure gold to the model, between the finished abutments in position thereon, and then trimming this to conform to the size of the necks of the teeth to be supported by it. The general form of each "dummy" may then be made by filling in between this

saddle thus adapted to the model, and the backing for each respective tooth, with wax, after which each piece may be invested and cast. Or, in instances where this space is *exceedingly small*, it may be filled with solder.

In this more or less typical fixture (Fig. 7) it will be observed that practically no gold is displayed anterior to the second molar, and yet that a maximum of strength presents throughout.

In cases where complete absorption has not occurred, a saddle is, of course, contra-indicated, but in these cases the neck of the porcelain tooth should accurately fit and bear *firmly* upon the soft tissue, and the lingual surface of the backing should then be so formed as to be as nearly convex or self-cleansing as possible.

TECHNIQUE.

In the application of the Goslee tooth to the construction of fixed bridgework, the following technique should be observed: First, all of the crowns or inlays which are to be used in the support of the fixture should first be made and finished separately.

Second: These should then be placed in position on the supporting roots, or teeth, and an occluding "bite" taken in wax. When this has been obtained, an impression—always in plaster—should follow.

Third: When the impression has been obtained, force each crown or inlay well to place therein, and be sure that they are securely held in proper position. Then varnish and fill impression with a good soldering investment material.

In separating model from impression, be careful not to loosen or break off any of the crowns or abutment pieces, and when the model has been separated and properly trimmed, carefully adjust wax "bite" and mount upon the articulator.

Fourth: Select teeth of proper size and color. The selection can be best made with the sample molds, fitting them to the model, and *recording* the mold number selected for each tooth separately. Care should be exercised to select teeth as nearly the proper size as possible. In this connection, observe the same precautions as to size and possible grinding as indicated for single crowns, and for the same reason.

Fifth: When teeth of the proper size and color have been obtained, and any little grinding demanded has been done, each tooth should be backed up separately with 38 gauge pure gold. This may be done by either swaging or burnishing.

If the swaging method is used, fill the swaging ring with soft modeling compound and slightly imbed the tooth therein. By means of the soft rubber plunger and swaging press, the backing may then be swaged directly to the tooth. When a swaging outfit is not handy, a good adaptation may be effected by burnishing. As soon as the backing has been properly adapted and all surplus trimmed away, perforate the

backing to accommodate the small post which comes with, or may be made for, the tooth. Sustain the relation between backing and post with wax, remove from the tooth, invest and tack together with a small bit of 22 or 20 karat solder.

Sixth: Adjust all of the teeth thus backed up with pure gold to proper position on the model, using soft wax to sustain them. If the projecting surplus ends of the posts interfere, they should now be cut off, always allowing a sufficient length to insure ample strength in their subsequent attachment to the finished backing to remain. This should never be less than 1-16 of an inch, and for cast work this end should be "headed" by grooving or notching. The fusing of a small bit of solder to all surfaces to become attached to the casting will also insure a better physical union.

Seventh: Moderately soft casting wax should now be added to each backing until the form, contour or shape desired in the finished piece obtains, carving each backing up *separately*. Fig. 8.

The sprue-wire should now be attached, the porcelain tooth removed, the backing invested and the casting made.



Fig. 8

The use of a thin pure gold backing on each tooth in this manner insures a proper relation of the short sustaining post, and a smooth, well adapted surface presenting to the porcelain, such as would not obtain if the tooth was backed up entirely with wax. It also overcomes any change of form which might result from shrinkage or warpage of the casting.

While backings for two, three, or even four teeth might be cast in one piece in this same manner, it is not advisable, because of this shrinkage or warpage, and less display of gold between the teeth, greater strength and all-around better results are to be obtained by casting each backing separately, and subsequently uniting them with solder.

The desired re-enforcement of the backings and the general form of the lingual surfaces may be obtained with a high grade of solder, instead of casting, but greater and more uniform strength, as well as better form, result from casting.

Eighth: When each backing has been made and finished, the teeth should then be placed in position therein, and all of the parts then assembled in proper relation on the model. This relation should be

securely sustained with hard wax, melted against the backings and the model, being careful not to allow any of it to get on the porcelain teeth. All of the teeth should then be carefully detached from their backings, the spaces between each backing and the abutment pieces filled with soft melted wax to keep them clean, and the case invested for soldering. Great care must be exercised to have the case so invested as to insure the proper relation of the parts during their assemblage with solder.

Ninth: When the investment is hard, all particles of wax should be removed with boiling water to insure clean joints. Small pieces of platinum or iridio-platinum wire should now be fitted into each joint. As these joints are necessarily small and solder is always more or less brittle, some re-enforcement, such as strong pieces of wire, is regarded as absolutely necessary to insure ample strength. In this connection the utmost care must be exercised in obtaining a maximum of strength in every joint, and particularly in the attachment of the abutment-pieces. It must be remembered that the strength of the porcelain in these teeth is adequate, but that this strength is obtained to some extent at the expense of the amount of gold used in the completed structure; therefore, the amount of gold necessary, being diminished, all of the strength possible in each and every joint is demanded.

Tenth: When all of the joints have been thus re-enforced and strongly united with not less than 20 karat solder, the fixture should be thoroughly cleaned in the acid bath, and then finished with stones and disks to the point of polishing. The teeth should now be cemented to place, using a cement approximating the color of the tooth, and not attempting to mount more than two with any one mix. When the cement is thoroughly crystallized, the piece may then be finally polished and mounted.

Second: For those cases in the anterior region where abnormalities of occlusion or elongation of the opposing natural teeth demand *thin facings*, the ordinary type of long pin facings may be used. In their use, however, the best results are to be obtained by previously backing them up separately with thin pure gold, adding wax to this to the desired form, removing the facing, placing graphite points in the holes which receive the pins, and casting. The pins may then be threaded and, when the backings have been assembled with solder, the facings may be cemented to position, thus obtaining all of the previously mentioned advantages of cementation, combined with better form and more uniform strength in the fixture.

Third: In addition to these, for those cases particularly in the lower arch, and in exceedingly "close-bites," where cosmetics is not a factor, or where the extent of absorption or the elongation of opposing teeth precludes the use of porcelain in any form, the all-gold, cast dummy may be used. Such dummies may be made to conform to the requirements of occlusion, adaptation to gum—if such is required—and contact with the attachments, in wax, and then invested and cast in one piece. This type

of "dummy" is useful in supplying the lower second bicuspid and first and second molars, and may include only the occlusal surface, thus forming the so-called "self-cleansing" type of bridge, or the entire tooth with or without a saddle, as the requirements may be. The former type of construction is indicated only where there is an excessive degree of absorption, which will permit of sufficient space between the gum and occlusal surface to insure self-cleansing properties, and wherever this space is not great enough *to be easily kept clean*, direct contact with the gum, will afford a more hygienic result. In other words, there should be plenty of space, or none at all.

With these, the problem of attachments and of intermediate dummies for almost universal application is simplified and systematized.

The remaining feature incident to the construction of all forms of fixed bridgework involves only the proper assemblage of the various parts. While some are casting all attachments and backings with an alloy of five per cent. of platinum and pure gold, and subsequently assembling them with pure gold, thus using no "solder" whatever, still a good grade of 22 karat gold, or *coin gold*, may be used with equally good results. When either of the latter is used, the final assemblage may be effected with 22 karat solder, *and providing there is absolute contact between all of the parts to be united*, the procedure is thus somewhat facilitated, and the results are uniformly good.

REMOVABLE BRIDGEWORK.

The same general ideas are also applicable to the construction of removable fixtures.

For this class of work, also, three general types of anchorage to the supporting teeth or roots will be found to adequately meet the requirements of the average case. These embrace, first, "clasps"; second, the "telescoping tube and split post," and third, the various forms of manufactured attachments.

Wide clasps encompassing three angles of the tooth, provided with an occlusal rest, not cast, but made of heavy rolled clasp-metal alloy, probably afford the very best means of obtaining anchorage to the natural or artificial crowns of bicuspid and molars.

That clasps should not be cast is especially emphasized, because the molecular rearrangement resulting from casting most of our present alloys destroys to a greater or less extent the very qualities of strength and resilience demanded of them, and which undoubtedly obtain best in a rolled or drawn metal or alloy.

In all forms of removable bridgework or partial dentures, where clasps are used, however, some form of "occlusal rest" is necessary as a means of providing against subsequent settlement of the case. If this precaution is not observed, complete loss of occlusion and usefulness will soon follow.

The telescoping tube and split post attachment is useful, particularly

when confined to the *roots of the six anterior teeth*, or in cases where the tube may be confined within the tooth.

The Roach, Morgan and other types of manufactured attachments will also be found valuable when used in connection with either porcelain or gold crowns or inlays on the cuspids and bicuspid.

In addition to these, I am pleased to call attention to a method of attachment which, while perhaps but a modification of some of the

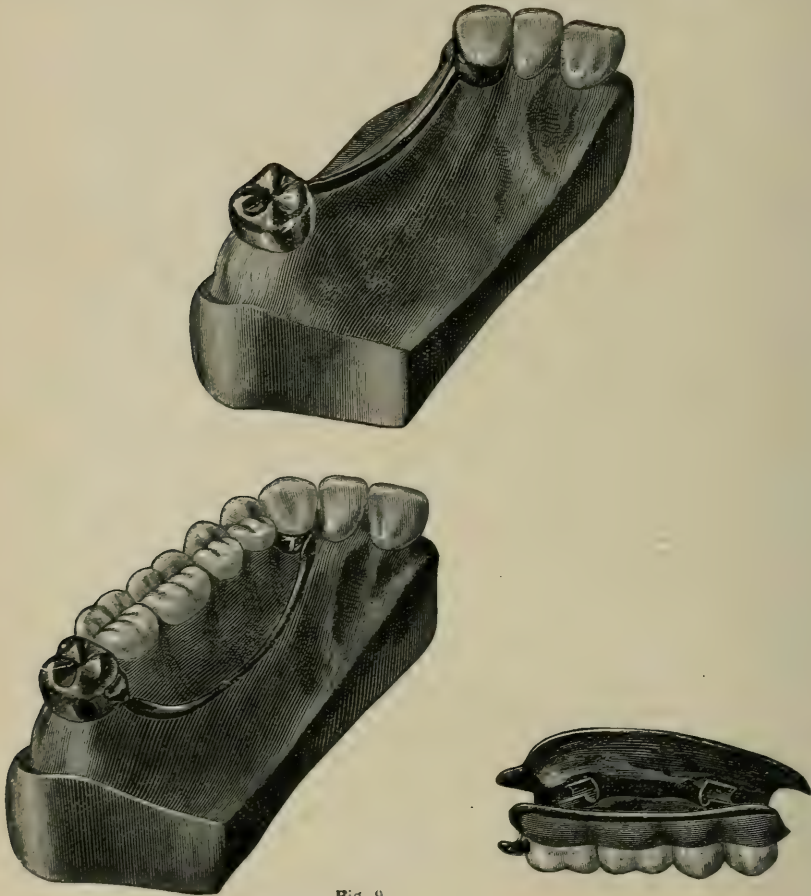


Fig 9

previously mentioned types, is entirely new and more or less universally applicable.

This attachment consists in utilizing the grasping principle of an open tube with straight and parallel sides, which is the removable part of the fixture, in combination with a round wire, of about 12 gauge, attached to and therefore a part of the "fixed" portion of the structure, but lying in a horizontal position instead of in a vertical one, in its relation to the supporting fixture.

Such an attachment may be made by utilizing the tube of a "Roach" attachment in combination with 12 gauge clasp-metal wire, and while simple and easily constructed, is especially useful in extensive cases, where the abutment pieces are assembled (Figs. 9, 10, 11) though equally applicable to less extensive, or to the most simple, cases.

It is easily applied, easily tightened when loosened by wear, takes up but little space, does not require absolute parallelism when more than one

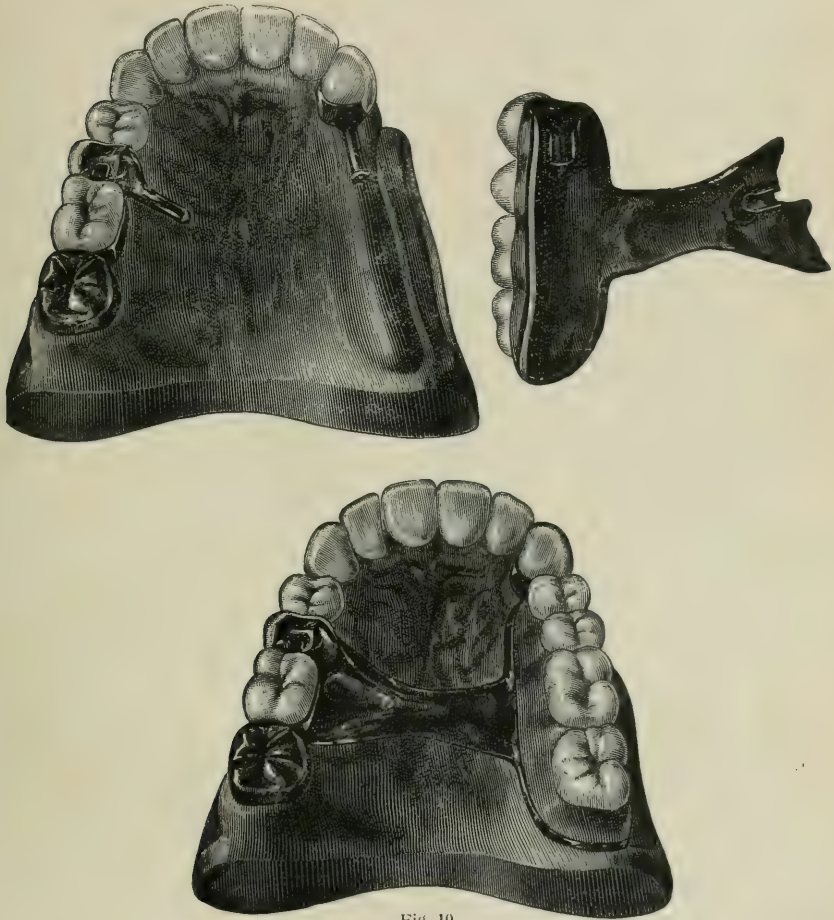


Fig. 10

is used on the same fixture, is applicable alike to either gold or vulcanite work, and is secure.

The conception of this attachment on my part was forced upon me in a very interesting manner. About a year and a half ago I inserted a large fixture in the upper jaw, involving the six anterior teeth and the two third molars, the latter being joined to the former with an iridio-platinum wire, 12 gauge, resting upon the summit of the ridge on each

side. In about the centre of the wire on both sides a vertical split post was attached. This constituted the fixed structure, which was cemented to place, the split posts supporting a removable saddle, which supplied the bicuspid and molars on each side.

A few weeks after the completion of the case the patient returned with one of these split posts broken away from the fixture, leaving nothing to hold that side in place. At first this seemed a calamity which meant only the destruction and removal of the structure, and the making over of the entire case. As this was not a particularly pleasant procedure to anticipate, and as necessity has always exercised a maternal influence upon the possible inventive ingenuity of man, it occurred to me that I might obtain attachment to that wire by grasping it with an open cylinder, or tube, lying parallel with it, and thus avoid removing and rebuilding the whole fixture. This I did, with the result that this side worked so well

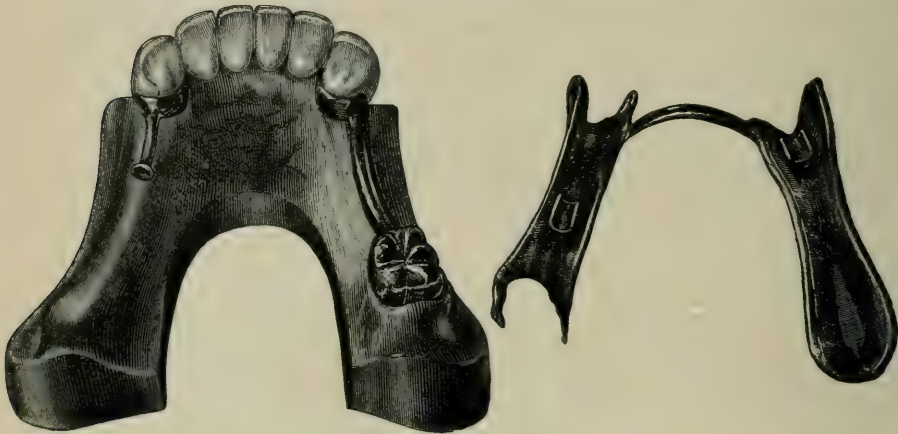


Fig. 11

and seemed so much stronger than the one where the vertical split post remained that I subsequently ground it off and used the tube, and the use of this form of attachment in many cases since then has given me more satisfaction than I have ever obtained from any other method.

A similar attachment, known as Gilmore's, is now being manufactured, and may be easily obtained by those who do not care to make it.

When the type or types of attachment thought to be best indicated have been selected, adapted, and completed, the casting process then offers splendid opportunity and great possibilities for the subsequent formation of the body of the fixture, and in this connection I believe that the successful casting of large pieces is only a question of the development of proper technique.

In the construction of cast bases, of any size, if a good model of a high grade investment material is obtained, and if the wax base is carefully formed, made sufficiently thin and properly stiffened, the process

offers the same assurance of accuracy of adaptation and of strength as previously indicated, and the possibilities are equally unlimited. For all forms and sizes of saddles, or bases, coin gold seems to be especially adapted to cast work, and to afford all of the integral strength ordinarily demanded.

As a final suggestion, permit me to again impress upon you the wonderful advantages offered by the casting process, the necessity for careful technique in its application, and the unlimited possibilities resulting therefrom.

CHAIRMAN BUSH: I am sure you are fully repaid for staying till the last day of this convention by hearing such an excellent paper. We have all enjoyed it very much. I will ask Dr. Nolin, of Montreal, to open the discussion.

DISCUSSION.

DR. NOLIN: Mr. Chairman, through some unavoidable misunderstanding it was only on the day of my leaving Montreal that a copy of this very important, interesting and authoritative paper reached my proper address. This and the fact that the essayist neglected or was unwilling to make a resume of his thoughts in one or more final conclusions, has made it impossible for me to open this discussion otherwise than in a very informal and superficial manner. However, I trust that you will not be the losers thereby, as it will give you a chance to know what my eloquent English-speaking friend Thornton will have to say about it. To the first ten paragraphs, in which Dr. Goslee insists on the importance of personal equation as a factor to success, and on the necessity of an accurate and correct technique, we must give our most emphatic and unconditional approval, with the reservation, however, that the same rule may, with as much reason, be applied to any method used in dentistry, and I might even say in any branch of human endeavor. We must also agree with the essayist when he says that an all-porcelain tooth is more advantageous than a metal tooth with a porcelain veneer, both for single crowns and for bridge work. Long before cast work was introduced to the profession a score of methods had been devised by which all porcelain teeth could be used for this purpose in connection with the soldering process, and to my mind it is still an uncertain question, whether some of the older methods are not still effective and more expeditious than those so far devised for the application of the casting process. That the casting process as applied to bridge work is still in early babyhood and has hardly as yet cut its temporary lower incisors, none of us, even the most enthusiastic, will deny. The difficulty of casting porcelain without danger of altering the same, in conjunction with the spreading tendency of wax models, which necessitates the swedging or the burnishing of a backing to each tooth and each root, the contraction of gold which

prevents the effective casting of more than one tooth at a time, the flexibility of a cast gold bridge as compared with a soldered one, the danger of altering the alignment and the occlusion of the teeth during the final stages of the work, the unreliability of most casting machines applied to this sort of work—I do not mean inlaying, but to bridge work—all these tend to make of cast bridge work, as so ably expounded by the essayist, and notwithstanding his most beautiful work, a most arduous and disquieting undertaking, which the average busy, hard-working and poorly-paid dentist will often not bear to try again after his first unavoidable and expensive failure. Nevertheless, the results obtained by those who have had the perseverance—and I may state here to explain what I am saying now, that the system of bridge work expounded by Dr. Goslee, which was most beautiful in every way, still necessitates for a bridge of four teeth thirty-two important operations. Nevertheless, the results obtained by those who have had the perseverance, the skill, and, I may add, the time to experiment with cast bridge work, have been so satisfactory that it is high time that the profession should wake up and make a concerted effort to solve the problems inherent to this class of work. That the casting of gold on porcelain, backed or unbacked with gold or platinum, with the technique and casting process in vogue to-day is bound to prove unsuccessful, all those who have tried it will willingly concede. But when the essayist says that “the attachment of porcelain teeth and even facings to the metal structure by means of soldering or direct casting is wrong in principle,” I must beg the liberty to protest against the sweeping finality of such a statement. I believe that gold can be cast on good porcelain if the rule governing the expansion and contraction of porcelain and gold are kept in mind and properly observed. They cannot be cast with the existing machines of to-day.

DR. GOSLEE: Why do you want to do it at all?

DR. NOLIN: In the one operation for a crown you would save five or six different operations. You eliminate some of the operations by casting directly on porcelain.

I believe, furthermore, that porcelain is not more likely to fracture or become detached from a metal backing made by the direct method than if cemented to it, unless it has been fractured during the heating process. If a facing is given the proper metal protection at the occlusal edge, it will resist the stress of mastication, whatever be the process used to attach it to the gold, if that process has been properly followed. Again, if a facing is exposed to the stress of mastication or has insufficient protection at the occlusal edge that the gold will bend under the impact of the antagonizing teeth, that facing is bound to give way, whatever be the method of attachment. The effect of the cement may be, at most, to stiffen temporarily the weak part of the gold and delay the disaster. Let it be well understood that I do not by any means wish to disparage Dr.

Goslee's invention, meaning the porcelain tooth he has shown us to-day. On the contrary, I fully appreciate the importance of his discovery, and look upon it as a great step forward in the betterment of past crown and bridge work; only when Dr. Goslee is known all over America and his word carries such authority, and he makes a sweeping scientific affirmation that gold cannot be cast on porcelain, unless it is based on real scientific investigation and statistics, it is apt to hinder the progress of cast bridge work, inasmuch as it will stop in America the research on that line of thought. Again, Mr. Chairman, let me say I have the deepest admiration for the work accomplished by Dr. Goslee. The work he has shown us to-day is certainly, to my mind, the acme of perfection in bridge work. While I protest on certain points, it is not because I do not approve of his work, because I work in the same line. I try to investigate to see whether it would not be possible for the average everyday practitioner to do this line of work, so that the ordinary patient who could afford to pay could still have the advantage of it. Another word before I close, Mr. Chairman. It was said casting a crown by making a platinum band to fit, holding it to the tooth, and casting solid gold over, was advantageous. I do not completely approve of it. I prefer the other system. This would be very useful in removable bridge work when it comes over a first crown to hold a piece of removable bridge work, but when it comes to ordinary bridge work, I would rather keep the elasticity of the band. The reason for using a band there is not only the expansion of the wax and the difficulty in holding it, but it is to give sufficient elasticity to let it go into place, and if we make a band that grips the tooth, we deprive ourselves of this elasticity that we need.

DR. CAPON: Mr. President, Dr. Goslee, Ladies and Gentlemen: Dr. Goslee comes to us with a reputation that we all envy. He knows his subject, and handles it in a masterly way. Being complete in every detail, and it hardly gives any one a chance to discuss it. He leaves no loopholes for a critic to attack. In fact, it is stretching a point to find anything to say, and I really haven't any business to discuss the paper at all. If I had the oratorical proclivities of the gentleman who is to follow, I would be happy in giving my commendation to such a paper and to such an essayist. I have been long enough in dentistry to remember the inception of crown and bridge work of the more modern evolution. It goes back as far as to remember when Dr. Richmond came from New York and gave a clinic in Dr. Willmott's office, I think it was, and that is some time ago. It was then looked upon by conservative practitioners as wholly unpracticable, and bound to meet with an untimely end, but with all the abuse it has weathered the storm, and when judgment has played a part, it has been a blessing instead of a curse. With the same degree of skepticism any new innovation has met a would-be death blow, and would

have taken the count, if the far-seeing and progressive men of the profession had not had the courage of their convictions and proved its worth by general acknowledgment. Now, we have of more recent date that which has revolutionized both operative and prosthetic dentistry. It reminds me of a person asking if a tomato is a fruit or a vegetable when one asks, is casting for crown work prosthetic or operative. Casting, unlike other new innovations, was recognized and accepted from the day Dr. Taggart introduced his ingenious invention to the profession. It has been a god-send to the practitioner and to the patient, which goes to show clearly that the progressive dentists of to-day are more willing to accept innovations and new theories and new inventions and ingenuities than they were many years ago. This was accepted the very minute he produced it, and has been carried along with success, and we find it to-day in the hands of Dr. Goslee by the method he has produced, almost perfect. Years ago when I was one of the few ardent advocates of porcelain, inlay and crown work, I used to remark, "Take away my vulcanizer, but leave my furnace." To-day it would be a great trial for the furnace to go, but it would have to go to give way to the Taggart casting machine. That is just a little equation to show the importance of the casting in a man's practice. It is something like a woman with a big family, such as, I understand, they have in Quebec, but she can't spare any of them. Now, I could not spare my porcelain apparatus, as I use it every day. In the early part of the paper the essayist said something regarding the casting process having a tendency of raising the standard. I agree with this in part, but from personal observation I find this to be true from the standpoint of gold, but with a detriment to the esthetic, with the tendency to place the porcelain furnace out of reach on the upper shelf. I made a note of the paragraph where the essayist drew our attention to the fact that a very few years ago crowns, and especially bridges, were but an indeterminable mass of empiric detail. A few years ago a great part of the journals were used to tell the wonderful methods of some ingenious brain on the attachments and construction of bridges. There is no one man in the profession or the present decade who has done more, or possibly as much, to place crown and bridge work on its proper scientific footing as our essayist of to-day. He has taught it in the colleges, and his recent edition as a text book has and is performing a duty in systematizing the teaching along stated lines, both to the student and the older practitioners. He has never lost sight that ceramics have a just place, and his new designs clearly show he is working along the lines of the esthetic, when he advocates more porcelain and less gold. In the paragraph in the paper "All Porcelain Teeth versus Thin Porcelain Facings," the essayist makes good points in favor of the all porcelain teeth. For anterior work it is obvious it has better form, better color, and greater strength. These are all just claims. For bridgework it has certainly

esthetic advantages and will no doubt give better results in mastication. This is no doubt true. How quickly a denture will wear a gold crown through so that it will have to be renewed from time to time, showing the tritulating effect of the porcelain is much greater than the gold, so if it can be made with sufficient strength then there is no reason why we should not use it. I may say here that I have always had a tendency to porcelain, and I think my reputation may go that far. I think I may say in all my practice I made it a point that I never would disfigure; and I never have to my knowledge, with a piece of gold in the front of a mouth, or any part where it could be avoided, except where strength had to be sacrificed. Of course we all have our failures with porcelain, but not any more so than with gold. From my anxiety to produce better cosmetic effects in posterior bridges, I could relate some sad experiences in adopting bicuspid made by some makers. However the variety of forms manufactured could hardly be expected to meet the individual in hand. Therefore there is hardly a case that has not to be ground and often stained to conform to the individual case in hand. I was very pleased to see the sample of teeth shown, that is, the full set, as that is the first set I have ever seen. I have been unable as yet to get only a certain limited supply in our Canadian houses, and no anterior teeth at all. I am therefore not able to discuss the merits. To grind that little shoulder so it will pull out of the wax, takes a great deal of time, and then you have weakened your tooth across that portion where you particularly wish to have the strength. Dr. Goslee has overcome this weakness to a great degree if we do not have to grind. It is up to Dr. Goslee to give us the moulds.

DR. GOSLEE: It is up to the manufacturers.

DR. CAPON: A very considerable portion of the paper deals upon bridge work, and the essayist has particularly chosen the upper bicuspid for his abutments. Upper bicuspid are weaklings according to their structure, and are prone to fracture more than any other tooth. I always feel they were not constructed in accordance for what they are called upon to do. So with the porcelain bicuspid they are also more prone to fracture, they are also weak just at the point where they should be strong, and although the essayist has shown us, possibly, new designs of teeth that he thinks will overcome that to a great degree. We have to grind out that shoulder which he claims is so important, and in doing so makes a weak tooth. If I may be permitted I would like to ask the essayist if he could not have made the recess for the dowel or the well in the tooth half the length and leave more porcelain. I think in making a seat or a cup of gold for your porcelain to be embedded in it should require very little post to retain it in position, and therefore you could have it half the length. It is a particularly long one in the tooth that has been shown, and I think little more chance of a fracture. I noticed that a great deal of stress was placed on the bands for the abutments of bridges. That is,

I think, essential. We have all recognized that for a long while, although it is not always done, and I draw attention to the fact that Dr. Goslee's band is not the band that is usually used. You notice the band he uses is very fine and down a very little distance on the free margin of the gum. Dr. Goslee talks about bands, but if he saw the bands we see he would have a very different opinion. The band Dr. Goslee means is simply a burnished band on the face of the root and a little over the margin. In preparing the root or bicuspid, or any tooth, I make a little well as it were around the canal, and try to get my platinum down to the bottom with the dowel, and the well filled solid with platinum and gold, gives wonderful retention to crown. (Dr. Capon here shows models of teeth.) Now, duplicates are necessary, like carrying an umbrella. If you have them you don't have the breaks, the same as if you have an umbrella it does not rain. Duplicates are very essential and should be carried out on a regular system.

Now, I have just made a few little notes here about which I may say a word or two. Regarding the warpage and shrinkage of gold in casting which was referred to—if this is correct, then why does he cast at all if there is a shrinkage there and he can get more accurate results by placing a backing on the bicuspid face. It seems to me if he can back that tooth with thin pure gold and have it as accurate or more accurate than he will get with his casting, on the same principle he gets it just as accurate as placing it over his root. In casting there is always some little thing that may keep that porcelain from going into position. It may be a little bubble or just a little shrinkage, but it does not quite get there as nicely as before.

DR. GOSLEE: That is the reason why I use the pure gold.

DR. CAPON: Then why do you continue on without casting at all? I cannot see that that burnishing or pushing it on with the press is not as perfect as that casting.

DR. GOSLEE: It is. It does not make any difference whether you burnish or swedge. It is easier to swedge.

DR. CAPON: Then in the majority of cases you have wax between the tooth and the coping.

DR. GOSLEE: That is to give you the form.

DR. CAPON: To make your form of wax without any backing you use that process?

DR. CAPON: We have discarded the casting of these sometime ago. I found it was too intricate. The bringing up of that fine wax along the sides of the teeth is so intricate and delicate that one will keep on breaking them. One will sometimes make two or three before getting a perfect one, so I lean to the idea of burnishing and press backing on every tooth. One point the essayist made that is very essential, and that

is filling the band after making your all gold molars with investment after you have taken it from the patient's mouth, before you begun your final carving. Some will start to carve and move it a little, and you have to grind it off, and you can't understand it. Get the patient to bite and chew onto that when you are doing your carving, and fill it with investment. I went down to New York some time ago and I thought I got onto some new ideas, but Dr. Goslee has them all.

DR. THORNTON: Mr. President, Ladies and Gentlemen: An old gentleman said to me some years ago that if you want to know what to say you should go to Scotland, but if you wanted to know how to say it you should go to Ireland. It has become quite evident to you that my friend Nolin has not spent all his time in Ireland, he knows what to say and how to say it. I suppose it would be the proper thing for me to begin with a eulogy of Dr. Goslee. I am not going to do it; I know him too well. Neither am I going to offer as an excuse for my inability or failure in discussing the paper the fact that I haven't had it. I had it sufficiently long to read it over carefully several times, but I am going to say this of Dr. Goslee, that having read his paper, and every paragraph was a single sentence in the first part of it, there were modifying expressions almost innumerable, and I said what does Goslee mean by this? However, this I recognized, that he was speaking as a man who was a teacher of this subject and one who had practised it, and he was fully cognizant of the fact that there is no absolute language that can be used. To make an absolute statement means to invite criticism and failure, and so after making this statement and that statement it was modified in such a manner that the truth might ultimately sink into our minds.. It reminded me of a story I heard some time ago of a preacher, who, in his morning sermon got mixed up in a long sentence, and when he was inextricably lost, he said, "Brethren, I have lost my subject, and I don't know where my predicate is, but praise the Lord, I'm on my way to glory." You may sometimes think that Dr. Goslee has lost his subject and is not always sure of his predicate, but all the time he is on the way to better and saner conditions in crown and bridge work, and you can rest assured that if you do not fully understand it just at first that a careful criticism of what he writes will bring a knowledge of the subject as perhaps you have not had heretofore. I will not take up very much of your time in discussing the paper. Reference has been made in it to crown and bridge work as a specialty. We had this subject up somewhat at the beginning of the session, but crown and bridge work is no specialty in dentistry. It is a legitimate part of it that every man should be able to do. I will go further even than Dr. Woodbury, I would not exempt orthodontia. Every man who goes out from a dental college should be able to practice efficiently crown and bridge work, prophylaxis and orthodontia. It is true in some cities these things may be better carried on by men who give their entire attention to it, but there is

a field in every rural district, and the men should be able to fill that field.

Now, let me say something about Dr. Goslee. I know something of the work that Dr. Goslee was kind enough to show to us. When I was in Buffalo I stated that Dr. Goslee's teeth were a godsend. You will learn of that as they are now on the market. But I want to warn you not to expect, because you adopt Dr. Goslee's teeth in your practice, to go home and do just as perfect work as you see here on these models. The conditions in the mouth are not just always the same as the conditions on a model. I was anxious to make as good an appearance here and as good an impression as possible, and I asked three or four of my friends down there if they would supply me with some word that I might use that would make an impression, and my good friend, Webster, with his well known creative ability said to me, "Say slobberification." (Laughter.) Now, you have slobberification to deal with in the mouth sometimes and it sometimes interferes with the production of the finished piece of work.

There is just one thing I want to draw your attention to. Dr. Goslee emphasized the necessity of making duplicates when you were making your crowns and bridges, when you make a bridge take the same mould and lay one way so that in case of failure you have something to replace it with without difficulty. Well now, that does not appeal very strongly to me because sometimes my patients will move away from the vicinity in which I live, and sometimes they do not come back to me. Then if the first one breaks and you use the second one it may break, so there is a necessity not only for a second, but for a fourth or fifth, and it becomes a sort of burden. I think it is a great compliment to Dr. Goslee that so many have stayed over. I do not think that another man could have held the crowd here until this time. There is one thing that would have perhaps increased it and that is, if he had announced it as an easy method of doing crown and bridge work. But there is no easy way, and there is no man who knows that so well as the man who has attempted to teach it. He gave a warning that I wish to emphasize. He said it is absolutely impossible to get the best results by depending upon the laboratories to produce the finished product. There never were truer or saner words said. I know something of the laboratory men of Toronto and their ability to do good work. I have been in their laboratories, and if you saw the impressions and the models that are sent there you would wonder that the work was as good as it is when it comes back. It looks nice in your hand, but after it comes back then you have to cut down your tooth to fit the bridge rather than make the bridge fit your tooth. You can set this down as an absolute fact that no successful bridge work can be done unless the abutments are made by the man himself at the chair. Then if it is desirable these may be sent to the laboratory man, but that is an absolutely basic principle that nobody can get away from. (Hear, hear.)

Now, doctor, the cause of failure—because that word success and failure has been used—is this, that the dental profession has not yet realized how much work must be put on a molar or a bicuspid or any other crown in order to produce a condition where success can be met by a close adaptation, for let me say that success depends more largely on accuracy of adaptation than on perfection of polish. It may look well, but that does not mean necessarily that success will follow. There is another thing to which I would like to draw Dr. Goslee's attention as an author that I believe would help the dental profession, and I think the same thing was referred to this morning. In taking a bite to obtain the occlusal part of the tooth to put on your band, put a piece of wax under and have the patient close, and in every book I know of that is published on the subject the instruction ends there, leaving the impression that just as soon as one tooth bites into another you have a perfect anatomical articulation. Let me say then it would be necessary to say take this out and carve the wax into anatomical form so that you have a tooth the occlusion of which corresponds in anatomical outline with the natural tooth. A great deal of the difficulty is after it is in the mouth the occlusal bite looks like nothing in the heavens above, nor on the earth beneath, nor in the waters under the earth, because that is far from the plan that was followed by the Master Mechanic. By a strange coincidence the clinic that I gave here yesterday took the line of the work suggested by Dr. Goslee because I had his teeth, and I recognized the advantage of those teeth, and so I illustrated some of the methods you have described, one of casting without any facing at all, simply a post up and then shove your crown on, and the other was to make a cope covering the end of the root and put the wax on that. The other method was to make two copes, one on the root and the other on porcelain, and my preference is then to fill in between those with solder rather than casting, for the reason that you can get a smooth polish and accurate surface without any probability of accident.

Let me offer a suggestion. When teachers meet annually—and I can speak from an ex-party standpoint at the present time—if these men would get together in sections, the crown and bridge workers in one section, the operative dentists in another, the time would be better spent in the discussion, because I can sit down and discuss a subject with Dr. Goslee and Dr. Nolin because they know the difficulties and I know the difficulties. Then a standard work which would standardize the practice could be gotten out which I believe would bring about the very best results. Then the question of using clean gold is most important. Dr. Goslee emphasized that. Just let me tell you how it can be done for fear some one may not know, for after all the advantage of coming here is that every man may get a little information which he can take home with him and thus do better work—if your gold gets dirty, if you have only used it once, never use it the second time without cleaning. It is easy to take a little pulverized

borax and pulverized saltpetre and melt the gold, using the mixtures as a flux. Dr. Goslee is a man essentially of careful methods. That does not come with the training of a week or a day, it is a life work, and it means association with men of like habits, and I always feel when I meet men from Chicago like taking off my hat for the thorough systematic manner in which they do their work in teaching the profession. Some of us had a chance last January to see an example of that. The most perfect piece of work that I have ever seen in connection with a convention were the arrangements made in Chicago last January to visit the schools and see the work there. It was but one evidence of the systematic manner in which all the work of the men in Chicago who are connected with the schools is done. I congratulate you most heartily, sir, and I welcome you to this country. You know now why I did not have any eulogy, it was because I knew the man, and flattery does not appeal to a man like that. (Applause).

DR. GOSLEE: (Closing discussion) Mr. Chairman, Ladies and Gentlemen: I am delighted with the discussion which has followed the reading of my paper, and I can assure you that I am very grateful to you for your forbearance in listening to so long a paper. There are just two or three little points brought up in the discussion which I care to touch upon, and that is only for the purpose of setting myself right. My dear friend, Dr. Nolin, suggested that it was possible that some of the older methods were still useful. Indeed it is more than possible, Dr. Nolin. It is probable many of our older methods will always be found useful, and I would not have you think for a minute that I desire to condemn the older methods which we find useful even to-day and may, as I say, for many years to come. He referred to the flexibility of casting work compared with soldered work, and I believe that I understand exactly what he means, because almost everywhere I have been discussing this subject the question of the stretching of cast bridges and partial dentures has come up. If he meant the stretching of flexibility there is no question whatever but large cast pieces will stretch and that their tensile strength perhaps is not as great as is the tensile strength of a soldered one, but I said in the paper and I still maintain that cast work if made in small pieces and subsequently attached with solder is stronger than an all soldered case as well as being stronger than an all cast case, and I regard it as being because when we have a part of our work like the various individual pieces made of casting and then those attached together with solder we eliminate the flexibility of the cast pieces and the brittleness of the soldered pieces, and I believe therefore you get the highest possible strength. Now, I have in none of my efforts to systematize my work and bring about the best possible results ever counted the exact number of operations necessary to complete an individual piece of work. I have had simply the ideal of perfection ahead of me to guide me along, and at the same time I have appreciated the fact

that if we could accomplish that as expeditiously as possible it would be desirable. However, as a general proposition I want to condemn emphatically the evil of hurrying your work through and reducing it to as few a number of procedures as you possibly can, because in your efforts to reduce that number of procedures I am very much afraid you are going to lose something of the accuracy and perfection in the finished result. Now, I must again refer to Dr. Nolin's discussion, and particularly to that part of it in which he brought out castings against porcelain. If there is a single thought in this paper that I would like to leave impressed upon the minds of those present here this morning it is work away from castings on porcelain and not towards it. There is absolutely no advantage whatever to be gained by castings against or upon porcelain, with the bare exception of saving time, and there is every disadvantage, the principal one of which is the absolute uncertainty incident to it. If you ever see a copy of my book you will find a certain statement there which says that the cracking of porcelain facings in solder is absolutely inexcusable, and it is, but the cracking of porcelain facings or teeth in castings is not inexcusable, because you don't know what is taking place down in that mould when you shove your molten gold down upon those teeth. You can prove it to your own satisfaction as I have done not once, but many times. Take two teeth of the same size, for instance a pair of central incisors, backing them up with wax, being just as careful with one as you are with the other, and if they both come out perfect the first time try again, and before you have done that very often you will find you have got one without a check and the other one with several, done absolutely under the same conditions, all of which proves that there is a very great element of uncertainty which is eliminated by the process of cementation. In addition to this element of uncertainty, and I emphasize the fact, you have destroyed the integrity of your porcelain by unnecessarily subjecting it to heat. That is avoided by making your backing to fit your porcelain and cement your porcelain on. Then you have the opportunity of replacement in the event of accident, which is not true when you cast on your porcelain. So please believe me as being sincere when I differ with my friend, because I do not want you to be misguided, if you please, by his remarks with reference to the possible usefulness of casting against porcelain. I did not say it could not be done in my paper, and I do not want that idea to go out. It can be done oftentimes, but its element of uncertainty, together with the two other objectionable features to which I have referred makes me say emphatically and positively I do not believe in it, and I think every porcelain tooth placed in the mouth on either a crown or fixed bridge should be cemented to place, and since we can make a backing to fit it there is no reason why we cannot get all the strength possible to be obtained wherever porcelain is used in whatever form it is used by cementing.

I was very much disappointed to hear my good friend Dr. Capon criticize Mother Nature in her formation of the first bicuspid teeth. This first bicuspid tooth has not given me the same amount of difficulty that it seems to have given him, although I appreciate the point he mentions. I will admit the first bicuspid tooth in the upper jaw is the hardest root we have to contend with the building of a crown, but I also said in the paper that the most difficult root was made just as simply as an easy one by this indirect method. Let me emphasize again, if you please, that I never have done work with as much satisfaction to myself and with as much comfort to my patients as I am doing now in making my crowns along the lines that I have suggested to you. I am transferring a lot of the work I used to do in the fitting of bands from the mouth to the laboratory, and every bit of that work you can transfer from the mouth to the laboratory saves the patient just that much. Someone has said, I believe it was Dr. Capon, that my method took a little longer than necessary. He did not want to give his patients an additional sitting and therefore he sent his impressions to the laboratory and had his metal made instead of waiting for amalgam to harden. All of that has been considered. Time is always so important a factor that it must never be overlooked, but you see I divide the three sittings required, or becoming necessary, in the construction of a crown by this method, into short sittings, the aggregate amount of time expended from beginning to end not amounting to any more. We do not wait for this amalgam to harden to try it in that same day. We do not usually have to. It might be in an emergency case where we had put a crown on and had to let the patient go out of town necessary to do it that day, but you won't find that very often, and I believe the average patient would rather come three times for thirty minutes each than to come once for two hours. I know that is true in Chicago. At neither one of those three sittings do we take over thirty minutes. In fact the first sitting is the only one that would necessarily require thirty minutes and that would be due to the preparation of the root, if that was difficult. The second one might require anywhere from twenty to thirty minutes, but the third one consists only in mounting the crown, and during all this time the temporary crown is being worn which relieves the patient from any embarrassment whatever and serves the valuable purpose of pushing the gum away so that you can observe your adaptation is accurate, and the irritating influence of your cement in mounting will be nil. Now, as to the depth of the hole in the tooth, Dr. Capon, this is caused by the oval lingual surface to which you refer. Now, you put as much porcelain there as possible because the more porcelain you have the stronger will be the tooth. It is to be expected, however, that some little grinding will be necessary, and wherever you have to grind you shorten or diminish the depth of that hole just that much, so we begin with the maximum degree of strength, the maximum quantity of porcelain, and that necessitates a maximum.

depth of hole in order to accommodate what grinding might possibly be necessary. As to these teeth, gentlemen, again I do not agree with Dr. Capon in that Consolidated teeth are brittle. I consulted with most all the manufacturers, and I studied the porcelain teeth of all the manufacturers before I decided to attempt to induce the Consolidated people to make this tooth for me. It has not proved a brittle tooth in my hands. I imagine that while the tooth broke as he says it did, without any question it was due to some unnecessary strain he put upon that tooth rather than to any brittleness of the porcelain. I have been working on a design of that kind for a number of years, and as Dr. Capon knows I went to Dr. Brewster five years ago and got him to make it, and when he could not make anything to suit me I began, as many of us did, to grind the Davis and Logan crowns to this form, and having used that design of tooth for bridge work for a year or two I was amazed to see that almost every tooth assumed about the same shape, and that was the cause of my working out a more or less uniform shape for that lingual or retentive surface which has resulted in the moulds you have seen to-day. Now, I am fully aware that as the number of moulds increased so will their general usefulness and general application increase. The manufacturers are starting off with 108 moulds, and that is really more than I thought they would give us to begin with. They assured me as the demand for them increased they would increase the number of moulds. In fact I have had requests from them already to send them moulds for different shaped teeth, so that they are anxious, I believe, to supply the demand and give you everything that will be necessary to make the teeth as universally applicable as possible.

I think of nothing more that was brought up. I appreciate the very kind words Dr. Thornton has said in my behalf, and I appreciate the very great courtesy that has been shown me this morning. The warmth of my reception made up for the absence of sunshine in the early part of the day and it made up also for the difficulties which I encountered in getting away and finding my way out here. I can assure you I have enjoyed every minute of my visit with you. (Applause.)

It was moved by Dr. Bush, seconded by Dr. Nolin, that a hearty vote of thanks be given to Dr. Goslee for his very excellent paper. A vote was taken and declared carried, the members heartily applauding.

GOLD AND CAP INLAY INSTEAD OF GOLD DUMMY ABUTMENT

Editor, Dominion Dental Journal:

Dear Sir,—On my arrival in St. John in June I jotted down the following example and dropped it in a drawer. To-day I have unearthed it. It may be worth printing.

"I had desired entering into the discussion of Dr. Goslee's paper delivered at Burlington Beach, but the chairman's ruling that there should be none other than that on the programme excluded me. I shall confine myself to but one point, and that is the case presented by Dr. Goslee, and fathered by him (Dr. Black's it was), which illustrated a bridge constructed for a lower molar restitution where the third molar was tipped forward at such an angle as to preclude the possibility of an ordinary cap crown attachment. Dr. Black had ingeniously constructed a gold dummy stump set in a position paralleling the stump of the anterior anchor tooth and cemented to the third molar. This artificial third molar attachment was anchored by two stout posts, but had no collar, being set simply like a Logan Crown. The case called to mind one of my own having almost identical conditions. In my case I constructed an ordinary cap crown, thus getting all the strength of the attachment to the stump and cast an extension to this cap having a cavity (carved in the wax) so shaped that an inlay cast for that again, paralleled the cap crown I had constructed for my second bicuspid. The completed bridge, the supply teeth of which were ordinary diatoric teeth, it need scarcely be added slipped into place like a charm.

"Dr. Goslee will agree that had Dr. Black constructed his case with a cap, instead of the flat plate into posts, his illustration would have been of greater value."

Yours truly,

JAS. M. MAGEE.

THE NEXT MEETING.

Dr. Don M. Gallie, Chicago, will be the essayist at the next meeting of the Toronto Dental Society. Such a distinguished organizer, author and orator will doubtless draw one of the largest meetings of the Society. The subject, "The Bigger Thing," lends itself to a broad scientific treatment and gives scope for the author's abilities.

This is another opportunity for the Toronto Dental Society to welcome back to Canada a Canadian who has become distinguished in the land of his adoption.

Selections

A VISIT TO THE NEW YORK STATE DENTAL MEETING AT ALBANY, NEW YORK

BY JOHN M. CAMPBELL, L.D.S., (GLAS.), D.D.S. (UNIV. OF TOR.)

This meeting was held in "Hotel Ten Eyck," and commenced on Thursday, May 9, and extended until May 11, and the writer had the opportunity of attending it on May 10. The programme for that day started with chair and table clinics at 9 a.m., and included eighty-seven in this class. A very large amount of floor space was allotted for this section, which included twenty-one members of the Rochester Dental Society, who were in charge of the oral hygiene branch, with special attention to children's teeth. Numerous clever contrivances were exhibited, and members of the profession were invited to ask all questions they desired, and courteous and satisfactory answers were always given. One short sentence which appealed to the writer was, "For the child—not charity, but justice."

Dr. A. W. Thornton, of Toronto, gave a very interesting table clinic on Roach and Gilmore attachments in bridge work, and also a most accurate method of constructing gold cast base porcelain crowns.

Dr. F. W. Low, of Buffalo, well known for his researches into the relation of potassium sulpho-cyanate to dental caries, demonstrated his method of restoring bicuspid and molars, with celluloid matrix and silicate cement.

Dr. S. Shapiro, of Brooklyn, showed a most ingenious and painless method of separating teeth with French silk.

Drs. Victor Jackson, Pullen, Fletcher, Gough, Watson, demonstrated interesting points in orthodontia.

Dr. Kauffer, of New York City, exhibited good results obtained in oral surgery, amongst which were necrosis, antrum, fractures and resection of the mandible.

Dr. J. H. Carter showed some splendid specimens of porcelain inlays obtained by the casting process.

Dr. G. H. Hiney, of Cambridge, New York, demonstrated a very clever and time-saving method of resetting vulcanite dentures. His plan is applicable only to those cases where the dentist is satisfied with the setting up of the teeth, but desires new vulcanite to replace the old. Let us suppose the plate to be an upper one. The palate is filed out almost to the teeth, and the gum pink is also well filed down. The case is now placed on the plaster model, and waxed up to the desired shape and size—invested in the flask, allowed to stand overnight, then wax is

removed, and flask well boiled—this softens the vulcanite, which can be removed from the teeth without in any way disturbing them. The new rubber is packed in, denture vulcanized and polished in the usual way.

Drs. Williams and Smith both showed the advantages of the general anæsthetic properties of nitrous oxide and oxygen. The latter used the "Teter" apparatus and the patients went under very easily, exhibiting no signs of excitement or nausea.

Dr. S. B. Harris, of New York City, was in charge of a really magnificent radiographic department. The specimens shown were of a very high standard of merit, and this gentleman, along with others, was very anxious to give assistance to anyone desirous of enlightenment on any point.

Dr. Dayton Campbell, of Kansas, demonstrated a clever and quick method of making cast gold inlays for four-walled cavities, with Keeton's gold. His technique was briefly as follows. He took a piece of this gold and melted a little inlay wax on it, then rolled it into a ball, and having previously moistened the cavity, inserted the gold, adjusted the margin, &c., removed and invested in a wire ring, filling in with 22-carat solder. The result was exceedingly good.

Later on I went into the exhibitors' section, and many interesting features were on display here. The Dentists' Supply Co. had one of the best exhibits—the anatomical articulation of dentures being the outstanding item. The New Gysi Simplex and the Gritman articulators with Snow Face bow were much in evidence. One of the employees of this company explained all the steps up to the finished dentures, and gave some useful hints in the handling of such cases, and although this kind of work requires a much longer time to accomplish than the ordinary run of full dentures, still if the points of superiority could be fully demonstrated to patients, the latter would only be too willing to pay a higher fee for the better service rendered on their behalf.

The Steele's porcelain facings and crowns were on exhibit, and many clever methods of using them were displayed, and although their use is fairly widespread at present, still the makers could treble their business if they would reduce the price of the gold backing.

Adrian S. Rutherford, of New York, showed a very useful combined measure for mercury and alloy, which saves waste and ensures accuracy.

J. W. Ivory was present with additional clever devices, amongst which were clamps, separators, and prophylactic instruments.

The A. C. Clark and Ritter Companies exhibited some new designs in cuspidors, and improvements in chairs, engines, and lathes.

The Electro-dental, Pelton Crane and Toll and Leeds had all pretty displays. The latest switchboard of the first-mentioned company had much praise bestowed on it.

Returning to the "Ten Eyck" in the evening I had the pleasure

of meeting a number of gentlemen with whose names I had been previously familiar, including Dr. Ellison Hillyer, President of the State Society. I received very warm welcomes from them all, in fact it would have been difficult to have found more sociable colleagues.

At 8 o'clock a special Memorial Service was held in honour of Dr. Safford G. Perry. A large number of dentists with their wives attended. The circumstances of this meeting were rather unique. Each year the New York State gives a medal to the dentist in America who does most for his profession during the previous year, and such an individual is admitted to the Fellowship of New York, which is considered the highest dental distinction in the States. Dr. Safford G. Perry was chosen last year to receive this honour, and the *confrere* who then proposed him was Dr. S. A. Freeman, the Chairman of the Fellowship Committee, while Dr. Perry was in charge of the Necrology Branch, and it is a strange coincidence that both these gentlemen, very intimate friends, died within a week of each other last December. The Committee of the State decided, however, that as the medal was for work achieved, they would honour the memory of Dr. Perry by presenting it to his family, who I believe will treasure it as a priceless heirloom.

The meeting was opened by appropriate remarks by the Chairman, Dr. Hillyer, who read letters of apology from all parts of the world, each testifying to the worth and esteem with which Dr. Perry was held. The messages included those of Drs. C. N. Johnson, Leon Williams, and Brophy, that of the latter especially being of a most touching nature, and displayed the genuineness both of the writer and of the beloved friend about whom he penned these lines. Dr. A. W. Thornton, representing Canada, spoke eloquently, and paid a high tribute to the personality of Dr. Perry. Speeches were then delivered by dentists from the North, South, East and West of America.

Dr. Darby, of Pennsylvania, accepted the medal on behalf of his deceased *confrere's* family, and in a short speech paid a high mark of appreciation to his departed brother-in-law as a man, dentist, and inventor.

The impression left on the writer was that America had not only lost a splendid specimen of what goes to build up the best in life, but also a clever dentist, and that the loss is not national, but international.

After the meeting was over, I again had a very pleasant time in social intercourse with many of those who attended the Conference, and there is no doubt that such gatherings as these tend to broaden one's views and dispel fallacies.—British Dental Journal.

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ELECTION OF MEMBERS OF THE BOARD. A DISCUSSION OF THE ACT AND ITS BY-LAWS

It would be worth the while of every member of the college to read carefully the "Dentistry Act" on elections and then read the by-laws on the same subject as contained in the blue book recently sent out by the Board.

Just after an election is held is the proper time to consider whether the election was conducted under the regulations as provided by the "Dentistry Act" or by the by-laws of the Board of Directors. It is the proper time to consider whether the act and the by-laws are understood or are sufficiently plain so that improper interpretations may not have been made.

It is the time to consider the whole machinery of elections because candidates and electors are at this time more interested in the subject than at any other time. If its consideration is left over until another election is pending many important matters may be forgotten.

Just how the present method of electing members of the Board was evolved or from where it was adapted is unknown to us, but by reading the act on elections and then reading the by-laws made by the Board it would seem clear that the designers of the act never contemplated the present method of election.

Let us quote Section 6 of the "Dentistry Act."

"6.—(1) An election of the Board shall be held on the second Wednesday of December, in every second year, reckoning from the year 1910; and the present Board shall hold office until the first meeting of the new Board.

"(2) No person shall be qualified to vote at such an election if he is in arrears in respect of any fees payable by him.

"(3) The votes at such election shall be given by closed voting papers, Form 1, which shall be delivered, or, if sent by mail, shall be received, at the office of the Secretary of the College not earlier than the third Wednesday in November and not later than the second Wednesday in December, in the year in which the election takes place.

"(4) The manner of holding such an election with respect of notification of the electors of the time and place of holding the election, the nomination of candidates, the presiding officer thereat, the taking and counting of the votes, the giving of a casting vote in case of an equality of votes, and *other necessary details*, shall be determined by by-law of the Board, and in default of such by-law, may be prescribed by the Lieutenant-Governor in Council.

"7.—Any member of the Board may at any time resign by notice in writing to the Secretary, and in the event of such resignation, or of a vacancy occurring by a death or otherwise, the remaining members of the Board shall, from the members of the College resident in the electoral district in which the vacancy occurs, elect some fit and proper person to fill the vacancy for the remainder of the term"

To begin with, sub-section (1) says when an election shall be held, note that it says, "on the second Wednesday of December in every year commencing from the year 1910." Note that it contemplates an election being held on that day, because it says in sub-section (3), lines four and five, that the ballot shall not reach the Secretary "later than the second Wednesday in December."

If an election is on a certain day a meeting of the electors must have been contemplated either for the nomination or the election with this view in mind read sub-section (4), which speaks of notification of electors,

nominations of candidates, time and place for election presiding officer at the nomination, the taking and counting of the votes, etc. It would seem clear that a meeting of the electors was contemplated either one general meeting for the province or what was most likely a meeting in each electoral district. Sub-section (3) makes it plain that the Secretary is not compelled to receive the ballots before the third Wednesday in November. There is no reason why they may not have been signed before that date; so long as the candidate is duly nominated or feels sure he is going to be nominated there is nothing in the act to prevent him from getting all the signed qualified ballots he can, so long as they are in proper form as shown in (form I. of the act), and not handed in before the third Wednesday in November and not later than the second Wednesday in December. Such ballots must be valid.

The act would in some cases work a hardship to some electors if they were compelled to be present at an election so as to poll a vote. To overcome this difficulty, sub-section (3) says the ballot *may* be sent by mail.

To repeat, it is clearly implied that a meeting of the electorate was expected as part of the machinery of the election. There is nothing in the act to the contrary, and everything to uphold this view.

The only objection to holding such a meeting would be the lack of interest in it and the cost to the Board, which might be nothing, or up in the hundreds of dollars, just as the Board chose. Since voting by mail is provided for, electors need not be present at the election. At an open meeting where the presiding officer receives the nominations of candidates, everyone present would know at once if a nomination is valid or not. At an open meeting the sitting member would have an opportunity of meeting his constituents and explaining to them what policy he had advocated in the past and what he intended to do in the future. New candidates could present their views, point out the mistakes in the past, and set forth a policy for the future. The candidates would be held to their utterances at public meetings. The actions of the Board and the actions of candidates could be held up for review.

The present method of nomination and election has little to commend it. A candidate once elected is more secure in his seat than a director on a stock company where the stockholders never meet. Only such doings of the Board are published as the Board deems wise. The individual action of a member is almost never published. There has not been a yea or nay on any question published for some years. Candidates may go on a still hunt for votes and present as many different policies as electors interviewed and never be caught at the game because the electors never meet to discuss such matters.

The Dentistry Act makes but few provisions for the formation and election of the Board of Directors. Section (4) says:—

BOARD OF DIRECTORS.

4. There shall be a Board of Directors of the College, hereinafter called "the Board."

(2) The Board shall consist of eight members, all of whom shall be members of the College, and they shall hold office for two years, and any four of them shall form a quorum.

(3) One member shall be elected for each electoral district mentioned in Schedule "A" by the members of the College resident in such district.

(4) No person shall be qualified to be elected as a member for an electoral district unless he is a resident in it and is not a member of the faculty of the School of Dentistry.

(5) One member shall be elected by and from the faculty of the School of Dentistry.

Section 4 provides for a Board, term of office, who constitutes the Board. Section 5 divides the province into districts. Section 6, as previously quoted, deals with how the election is to be conducted.

Section 4, sub-section (5), says: "One member shall be elected by and from the faculty of the School of Dentistry." There is nothing either in the act or in the by-laws to indicate that this election should be conducted different from the others, nor is there any definition of who constitutes the faculty. Is it not strange that this election should be held not on the day specified by the act, nor by closed voting paper (form I.). In no way does this election comply with the act nor with the by-laws for electing other members. Since no special mention is made of how this election is to be conducted, it is reasonable to suppose that it was intended to be conducted in the same manner as the others. There can be little doubt on this point, and if it be well taken, only members of the College who are not in arrears in respect of any fees payable by them, section 6, sub-section (2), can vote for a representation of the faculty on the Board. This excludes from voting all members of the faculty who are not dentists. All of this needs very careful consideration. It would seem at the moment to be a very wise provision. However, who may vote is open for debate, but there is no doubt about the manner of holding the election.

It would seem from the act that there were to be eight members of the Board and eight constituencies, seven members from seven electoral districts, one from each, and one from the faculty. The members of the faculty to constitute one constituency. This would seem reasonable, though a small constituency, it has a representative on the Board because it is perhaps more vitally interested than any other equal number of members. If this be true, then what right has a member of the faculty to vote in two constituencies, that is for a member for a district and also one from the faculty? It was not intended that he should, because in the voting paper the voter declares that he has not previously voted in this election, a declaration he could not

make both in his district and on the faculty. One man, one vote, was surely the intention of the act.

To come back to section 6, as previously quoted: It provides for an election, the date thereof, how often held, who may vote, closed voting and when the ballots are to be received, the resignation of members and the filling of the vacancy. Everything else in connection with the election of members is provided for in the by-laws, and the authority to do this is given in section 6, sub-section (4). We may state here that the Legislature makes the act as has been quoted, and the Board makes the by-laws. If the by-laws do not conform with the act, so much the worse for the by-laws. It is reasonable to suppose that any action taken by the Board upon a by-law which is contrary to the act would fail. (E. G. Little, V.S., Royal College of Dental Surgeons). This would seem to be well established.

Now read the by-laws on this section 6, as quoted below:—

BY-LAW NO. 27—TO PROVIDE FOR THE ELECTION OF DIRECTORS.

Sec. 1.—The counting of the voting papers for the election of members of the Board of Directors of the Royal College of Dental Surgeons of Ontario shall take place in such place in the City of Toronto as the Secretary of the Board shall direct, on the second Wednesday of December in every second year, reckoning from the year 1900, and the proceedings shall commence at two o'clock in the afternoon of the said day.

Sec. 2.—The Secretary shall, not later than the 15th day of October, in every year in which an election is to be held, mail to every member of the said College practising Dentistry in the Province of Ontario, addressed to his last known place of residence, a notice of the time, place and manner of conducting said election.

Sec. 3.—The persons qualified to vote at such elections shall be all the members of the said College residing in the Province of Ontario, who, on the 2nd day of November, in the year in which an election is to be held are not in arrears in respect to any fees payable under the provisions of the "Dentistry Act," and these alone shall be qualified *electors*. When the first day of November falls on Sunday, the following Monday will be considered as the first day of November for purposes of this By-law.

Sec. 4.—Every qualified elector shall be entitled to vote at such election for one duly nominated candidate for membership in the said Board from the electoral district in which the elector resides.

Sec. 5.—Every *qualified* elector shall be eligible to nomination as a candidate for election to the said Board from the electoral district in which he resides.

Sec. 6.—Any qualified elector may, by registered letter addressed to the Secretary, and mailed so as to be delivered to him not later than the 10th day of November, in the year in which an election is to be held,

nominate any *qualified elector resident* in the electoral district in which the nominator resides, as a candidate for election to the Board from the said district, but such nomination shall not be *dated* earlier than the second day of November, and no one shall be deemed a candidate for election who has not been nominated by at least two qualified electors. Any candidate so nominated shall be immediately notified by the Secretary, and may resign by registered letter addressed to the Secretary, so as to reach him not later than the 15th day of November.

Sec. 7.—The nomination paper shall be in the form or to the effect following, viz.:—

To the Secretary of the R.C.D.S. of Ontario:

Having obtained his consent to do so, I hereby nominate as a candidate for election as a member of the Board of Directors of the R.C.D.S., of Ontario, for the electoral district No.

L.D.S.,

a qualified elector resident in the said electoral district, his post office address being

in the County of

(Name of nominator)

(Post office)

(County)

(Date)

Sec. 8.—Only such nomination of qualified candidates by qualified electors shall be accepted as shall be received by the Secretary by registered letter on or before the 10th day of November in the year of an election. In any electoral district where but one candidate has been duly nominated such candidate shall be declared elected by acclamation.

Sec. 9.—As soon as may be after the 15th day of November, and not later than the 23rd of November, the Secretary shall mail to every *qualified elector resident* in any Electoral District for which two or more candidates have been duly nominated:—

(a) A list of the candidates duly nominated for the electoral district in which he resides.

(b) A blank voting paper in the form of Form One of the Dentistry Act.

(c) An envelope addressed to himself, and marked "Voting Paper, Royal College of Dental Surgeons of Ontario."

(d) Such directions to the elector as may be needful.

Sec. 10.—A voting paper to be counted at said election must be duly executed by a qualified elector in the form of "Form 1" of the Dentistry Act, and must be enclosed in an envelope marked "Voting Paper, Royal College of Dental Surgeons of Ontario," and must be delivered to the Secretary, or if sent by mail, must be by registered letter, so as to be delivered to him in either case, not later than one o'clock of the afternoon

of the second Wednesday in December in the year in which an election is held.

Sec. 11.—It shall be the duty of the Treasurer of the said College, immediately after the second day of November in the year in which an election is to be held, to furnish to the Secretary a certified alphabetical list of the names of all the members of the said College who, on the said second day of November, were not in arrears in respect to any fees payable under the provisions of the Dentistry Act.

Sec. 12.—From the list of names of members of the said College not in arrears, so furnished by the Treasurer, the Secretary shall prepare a list of duly qualified electors, alphabetically arranged, for each of the seven electoral districts prescribed by Schedule "A" of the said Dentistry Act, and these shall be the electoral lists for the purpose of said election.

Sec. 13.—Previous to each biennial election, the Board shall appoint two scrutineers. In case a vacancy exists at the time of an election from failure of the Board to appoint, refusal or inability from any cause to act, the Secretary shall fill the vacancy. For their services the scrutineers shall receive as remuneration the sum of \$5 each.

Sec. 14.—The persons entitled to be present at the counting of voting papers shall be the President, Treasurer and Secretary of the Board, the scrutineers and the candidates, or their representatives, duly accredited in writing.

Sec. 15.—The election shall be under the direction of the Secretary, who shall decide upon the eligibility of any elector to vote, and shall decide any dispute which may arise between the scrutineers, but he shall not otherwise interfere in the proceedings.

Sec. 16.—The counting of voting papers shall be so conducted that none but the scrutineers shall know how an elector votes, and these shall make, before the Secretary, a declaration of secrecy similar to that made by scrutineers at a municipal election.

Sec. 17.—At the time and place fixed for the counting of voting papers, the Secretary shall deliver to the scrutineers, unopened, all the voting papers received by him, in the manner and within the time specified, by the said Dentistry Act. The scrutineers shall at once proceed to open and count all voting papers properly marked for each candidate in each of the electoral districts.

Sec. 18.—In case, in any district, two or more candidates have an equal number of votes, the scrutineers shall by lot decide which shall be declared elected.

Sec. 19.—When all the votes have been counted, the scrutineers shall make a certified return in duplicate of the total number of votes cast in each district, the number cast for each candidate in each district, and the number of voting papers rejected, stating the reason for rejection. One of

these returns shall be handed to the Secretary and the other sealed up with the voting papers as hereinafter directed.

Sec. 20.—When the election is completed the scrutineers shall seal all the voting papers cast in each district in an envelope by themselves, distinguishing those which were rejected, and shall mark on the outside the number of the district from which they came. The scrutineers shall then put these envelopes in a large envelope, with one copy of their certified return, and shall securely seal the same and hand it to the Secretary, who shall deliver it to the newly elected Board at its first meeting.

Sec. 21.—On receiving from the scrutineers their certified return, the Secretary shall notify, by letter, the candidate in each district having the largest number of votes, of his election as a member of the Board of Directors for the ensuing biennial term.

Sec. 22.—Any candidate at such election, deeming himself to have been unfairly treated, may, within one month after such election, lodge a protest with the Secretary, and the matter shall be disposed of at the first meeting of the Board thereafter.

Sec. 23.—If from any cause the Secretary is unable, refuses or neglects to act in any capacity in which his services are required by the provisions of this By-law, the President shall appoint someone to act in his place, and such person, so appointed, shall have authority to discharge all the duties devolved by this By-law on the Secretary."

To begin with, the act says, section (1), "reckoning from the year 1910;" the by-law says, section (1), "reckoning from the year 1900." This by-law seems to be ten years older than the act upon which it is based. Strange that the by-law should be made first and the act afterwards.

By-law No. 27, section (1), says: "the ballots shall be counted on the second Wednesday in December." Section 10 further says: "so as to be delivered . . . not later than one o'clock of the afternoon of the second Wednesday in December." The act says, section 6, sub-section (3): "shall be received . . . not later than the second Wednesday in December." Thus the by-law says that the ballot cannot be received later than one o'clock on Wednesday and that the ballots are counted at two o'clock, while the act says not later than Wednesday. It must be admitted that 4 o'clock on Wednesday or any time up to midnight is not later than Wednesday. Consequently, to refuse to accept a ballot at any time on Wednesday is clearly contrary to the act, and to close the poll before the specified time is a question for the courts.

Section 6, sub-section (2) of the act says: "No person shall be qualified to vote at an election if he is in arrears in respect of any fees payable by him." Along with this read by-law 27, section (3), which

says only members resident in Ontario who are not in arrears on November 2nd in the year of an election are qualified electors. It must be shown that this limited definition of a qualified voter is "a necessary detail," sub-section (4), before it can override the clear specification of the act. If a member is in arrears on November 2nd, and pays all the fees demanded by the College on the 3rd, and obtains a receipt which says his fees are paid for the ensuing year, how can he be said to be in arrears during any part of that year. It is very doubtful if a member who holds a receipt for having paid his fees can be declared to be in arrears, and thus not allowed to vote. If every voter were compelled to send his receipt for having paid his fees with his ballot, it might overcome the abuse which this by-law was intended to correct. There is nothing in the act which would disqualify a member of the College resident outside of the Province of Ontario from voting if his fees are paid. The only way such members can be disqualified from voting is to show that it is a necessary detail of an election.

All that part of the election machinery relative to notification of electors and nominations are made by the Board. By-law 27, section (2), says: "The Secretary shall not later than October 15th, in every year in which an election is held, notify the electors of the time, place and manner of conducting the election; by-law 27, section (6), lines six and seven: "Such nomination shall not be dated earlier than November 2nd." Why should the nomination blanks be put in the hands of the electorate two weeks before they may be legally returned to the Secretary? If it is a wise provision not to accept nomination blanks before November 2nd, then why send out the nomination blanks until almost that date, say October 30th? Any member who does his business promptly is sure to be caught with an invalid nomination.

This question of nomination is rather a serious one when conducted as provided for in the by-laws. Only duly nominated candidates can be elected, and since the nominations are made by mail, there is no chance to make good an invalid nomination. In nominations as at a meeting the presiding officer must declare at once what nominations are in. There is a chance for correction. The act says the voting shall be closed voting papers. The method of nomination is left to the by-laws. There is every provision for the secretly and correct counting of the ballots, but the nominations are left in the hands of one man to declare valid or invalid; in fact he alone must interpret the act and the by-laws. It would be interesting to know how the Secretary interpreted by-law 27, section (6), which says, "such nominations shall not be dated earlier than November 2nd, etc."

The intention of the by-law was no doubt to prevent a member from nominating a candidate while there was any possibility of he himself not

being qualified to vote. In other words, if a member is not qualified to vote, he is not qualified to nominate. But the letter of the by-law says that so long as a nomination is dated later than November second it is valid. It would make no difference if it were in the Secretary's hands by October 20th, so long as the date on the paper was not earlier than November 2nd. No single official of the Board should be required to make such a decision; no matter which interpretation he makes, his action is open for criticism. The ballots, which are carefully scrutinized by two persons, are sealed up and kept, but there is no provision for keeping the nomination papers. One lone man in the quiet of his own office decides what candidates are properly nominated.

What real harm could come if any member was ineligible to make a nomination, or if need be, let the nominator see to it that he keeps good his qualification by paying his fees. The act itself does not say that a candidate must be a qualified elector or in practice, so why should his nominator be qualified? Section (4), sub-section (3) and (4). Nomination ought to be made as simple as possible, because no harm could come if a dozen candidates were in the field, while a hardship could be wrought by disqualifying one real, well-intentioned candidate who depended on his nominators. At the recent elections at least three would-be candidates failed of nomination from one technical cause or another. We are informed that one member failed to get two valid nominations out of seven. Another candidate had thirteen invalid nominations. The whole machinery for nominations should be redrafted and simplified, if not completely changed.

By-law 27, section 22, is very interesting in view of the history of Board elections. It reads: "Any candidate at such election deeming himself to have been unfairly treated may, within one month after such an election, lodge a protest with the Secretary, and the matter shall be disposed of at the first meeting of the Board thereafter." It is fair to assume that the successful candidate would not be likely to register a protest. The unsuccessful candidate has his protest disposed of by his opponent and those who will be associated with him for the next two years.

What disposition would be made of the protest? There is no act or by-law as a basis upon which to do anything. Once the Secretary notifies the candidate that he is elected, there is no machinery to unseat him, unless for such an offence as would cancel his license, and even this is exceedingly doubtful. There have been protests registered against candidates in the past and the matter disposed of; but how? Those who protested and alleged that fees of members had been paid or promised to be paid by a candidate—a clear case of bribery—were calmly told that there was nothing in the act or the by-laws to prevent it. The writer saw

the letter of a candidate which said clearly to a member that he would see that the matter of his fees would be fixed up. A candidate was at one time sent several signed ballots from unqualified voters with the suggestion that he could make them good by paying the fees. In an election a voter's name was said to have been forged on a ballot and counted at an election which was very close. As in the case of bribery, nothing could be done. It is doubtful if the matter was even reported to the Crown Attorney. The Board disposed of it.

There have been protests, charges and counter charges ever since the present method of election was begun in 1892. The Dental Act has been revised once or twice since then, but no election act has been incorporated. The Board must surely have seen the necessity, when there was undoubted evidence of unethical acts by someone interested in the election. No member would wish to hold his seat if he thought he had been elected by bribery or by forged ballots.

At any regular meeting of the Board a by-law could be passed which would unseat a member who had himself or his agents been found guilty of an offence against the ordinary ethics of an election. The Board, and especially the accused member, should not sit as judges at such an investigation. Such a by-law could be based on section 17 of the act, which says: "The Board shall make such by-laws as it may deem necessary for the proper and better guidance, government, discipline and the regulation of the Board, the College, the members of the College, and the profession, etc."

This section of the act expressly speaks of the government, discipline and regulation of the Board. It must have anticipated such a by-law as the one suggested.

This is a rather lengthy review of the Dentistry Act on elections and the by-laws based thereon, but it seems proper at some time to take stock of our doings. A careful reading of the act might bring out many other points for consideration and throw more light on what is here discussed.

Dr. W. C. Trotter was elected a member of the Board of Directors of the R.C.D.S. from No. 3 District.

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